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ERRATA

- Vol 14, p 159, 3rd line of 1st Summary, for eight *hours* read eight *days*
 Vol 15, No 4, p 273, line 6 of 1st Summary, for 1818 read 1919

TROPICAL DISEASES

BULLETIN

Vol. 15]

1920

[No 1

RELAPSING FEVER

MANSON (J K) & THORNTON (L H D) **East African Relapsing Fever**—*Jl Roy Army Med Corps* 1919 Aug Sept Vol 33 Nos 2 & 3 pp 97-116 pp 193-216 With 2 plates & 20 charts

This is a very long and detailed paper presenting the result of a study of 1,500 cases of relapsing fever (diagnosed by microscopic examination) mostly in natives, and comprising among them "members of almost every tribe in East and West Africa"

Epidemiology (a) Incidence and Immunity—Comparatively few cases occurred among Europeans but these were severe and were often followed by complications West African natives were very liable to severe infection though grave complications were seldom met with East African natives on the whole suffered from the disease in a modified form These clinical findings suggest that the East and West African relapsing fevers are due to two distinct species of spirochaetes

(b) Transmission—The distribution of the disease closely coincides with that of *O moubata* Increase in the number of cases was found to occur *pari passu* with the degree of infestation of native huts with the insect, and conversely camps and areas from which it was absent yielded no cases of the disease

The number of bed bugs, lice, fleas, and chiggers appeared to bear no relation to the incidence of the disease and microscopic examination of these insects (number not stated) was negative

Out of 600-700 ticks examined, 29 per cent were found to be infected The method adopted was to pull off a leg and examine the drop of serum which exuded from the stump As only a cursory examination could be made in each instance, the authors consider that their estimates of percentage are on the low side

(c) Incubation period—From a study of 74 cases it is concluded that the incubation is often considerably less than ten and may be as short as three days

(d) The Spirillum.—From an examination of many thousands of blood slides it was found that the majority of the spirilla were 20-35 microns in length and 0.25 to 0.35 microns in breadth and showed 5 to 9 spirals. "Shorter forms, down to 6 microns were met with

commonly, while, more rarely, types reaching even to 55 microns were seen." A type reaching a breadth of 0.6 microns was also met with and found to recur in subsequent relapses. The authors suggest that more than one specific type of organism was therefore dealt with.

The organism showed a tendency to progressive diminution in numbers at each relapse.

Clinical manifestations A minute description is given of a typical attack of relapsing fever, differing only in detail from the known manifestations of the disease. A saddle-back form of temperature chart indicates the presence of bronchitis. In first attacks it is a well marked symptom and may be of a pneumonic type, the signs closely resembling those of early pneumonia. In no case, however, did consolidation occur. Immediately preceding the crisis in the first attack and first relapse, 25 per cent of cases showed a rise of temperature of $\frac{1}{2}$ –1° above the highest point previously reached. In severe cases there may be marked enlargement of the liver, with or without jaundice. "In the general run of cases of tick fever the spleen is not influenced to any great extent." It is only when malaria is also present that this organ shows marked tenderness and enlargement. Leucocytosis was only found in cases with high temperatures which showed marked bronchial symptoms. The Wassermann reaction [technique employed and number of tests not stated] was negative throughout the disease. Urines [number not stated] were examined for the presence of spirilla with negative result. Nine cases of a fulminating type occurred in the series, their history being one of very acute onset followed by coma and death within 24 hours. The blood contained large numbers of spirilla. In a series of several hundred untreated native cases belonging to various African tribes, the average number of relapses was five.

A number of nerve lesions are described which cannot be summarized. Their salient features were their late onset (seldom occurring earlier than the sixth week) and their transient nature. They were probably toxæmic in character and occurred in not more than one third per cent of 1,500 cases. They were classified as (1) showing gross central nervous lesions (aphasia, hemiplegia, &c), (2) showing involvement of cranial or special nerves.

"The influence [on the temperature] of the presence of malaria in the blood of patients suffering from relapsing fever manifests itself in two different ways. *A Irregular type* (in which the attacks of the two diseases bear no relationship to one another). *B The regular type* (in which malarial rises were only seen during or following immediately the spirillum relapse)."

Prognosis is favourable in East Africans, less so in West Africans. There were four deaths among 1,200 cases in the former, and sixteen among about 400 cases in the latter. The authors are unable to give any figures regarding mortality among Europeans.

Treatment Salvarsan compounds were found to be eminently successful. Atoxyl (intravenously in one set of cases and intramuscularly in another), tartar emetic (intravenously), mercury salicylate (intramuscularly), quinine (intravenously in one set of cases and by the mouth in another), and methylene blue (by the mouth) were tried in groups of cases with adequate controls. The results were unfavourable. The authors mention that they found the

African native "very intolerant to mercury" and also that, basing their opinion on observations made in the treatment of syphilis and yaws in natives they consider the results obtained in these diseases with mercury salicylate "superior to those given by other salts of mercury"

Prophylaxis (a) for Europeans (1) Absolute avoidance of native houses (2) Avoidance of ground for camp site which has been used in the past by natives for camping (3) A well tucked in mosquito-net (4) Careful inspection of blankets when on trek (b) for native lines — (1) Provision of a hard floor, impermeable to the tick This was most suitably attained with ant-heap earth 'It was beaten hard on the floors to a depth of at least four inches and allowed to set, afterwards a top dressing of cow-dung was smeared over the whole surface to a depth of half an inch in a liquid condition, afterwards the surface was treated once weekly with a watery solution of cow-dung to maintain it in good order' Experiments had shown that ticks have a marked antipathy to cow-dung The insects did not appear to be driven to the roof by these measures as was feared might be the case (2) A reward of one cent was given for every *Ornithodoros* tick brought in (3) The huts were numbered, the number being shown on the natives' sick report so that, immediately after microscopic diagnosis the necessary sanitary measures could be taken with respect to the patient's habitation (4) Routine examination of blankets and kit of new arrivals at the camp and also a weekly inspection

The above measures resulted in one month in a reduction of incidence of the disease at the Carrier Dépôt, Dar-es-Salaam from one case per hundred porters per week, to one case per thousand

E J Wyler

TOYOTA (Hidezo) *Studien über die Recurrensspirochaeten in Mandschurien* [Researches on the Spirochaete of Relapsing Fever in Manchuria]—*Kitasato Arch of Experim Med* 1919 Apr Vol 3 No 1 pp 42-84 With 1 plate

This is a long paper dealing with experiments in animal inoculation and with the morphology and serum reactions of the spirochaete of relapsing fever in Manchuria

Very young mice (5-6 gm in weight) were successfully inoculated intraperitoneally with the blood of patients suffering from the disease The strain can be conserved by sub-inoculations, 335 of these were made in 3 years Inoculation of mice is more readily accomplished if the strain is first passed through two or three monkeys After ten passages through mice, but not sooner, young rats can be successfully infected Spirochaetes were found in the blood of guinea-pigs intraperitoneally inoculated from mice, for 2-3 days A rabbit was similarly inoculated, but with negative results The virulence of the organism is increased by repeated passage through rats and mice Relapses occurred in rats after the 204th subinoculation whilst after the 228th fatal infections were produced When first inoculated into rats and mice, the spirochaetes showed aberrant, irregularly bent and ring-forms whilst they were markedly smaller and thinner than those in the patient's blood These differences disappeared after several subinoculations.

Manchurian spirochaetes which had been passed through a series of animals were found to be morphologically identical with those of African relapsing fever which had been similarly subinoculated

Experiments in immunity showed that, for the strains used the Manchurian differed from the European and African strain, but that certain strains from Manchurian cases of the disease were found to differ from one another in their immunity reactions. It was found that passage through animals alters the serum reactions of the spirochaete, this suggesting that the parasite is endeavouring to adapt itself to new conditions. The Manchurian and African strains became in this way closely approximated. From an investigation of the relationship between the residence of patients and strains of spirochaetes the author found that cases due to different types may occur in the same building.

The spirochaetes of Manchurian relapsing fever reproduce by longitudinal division. A good plate is shown in support of this statement. The possible occurrence of reproduction by transverse division or by other methods is not denied.

The author considers that the classification of the spirochaetes of the relapsing fevers according to the clinical symptoms of the disease and the transmitting agent is probably incorrect and that in the present state of our knowledge it is impossible to differentiate them. The strains that have been found in various epidemics and districts cannot correctly be regarded as typical. Different varieties occur even in the same epidemic. He concludes from his experiments that immunity reactions are unreliable for purposes of classification and that, assuming the ability of the parasites to adapt themselves to their host, one might infer that different varieties of the disease are due to modifications which have occurred in one type due to passage through human and insect hosts or other unknown causes.

E J W

ROCHA-LIMA Die Uebertragung des Rückfallfiebers und des Fleckfiebers Bemerkungen zur Rickettsiafrage [The Transmission of Relapsing Fever and Typhus]—*Deut Med Woch* 1919 July 3 Vol 45 No 27 pp 732 734

In the first part of this paper, here summarized, investigations on the transmission of relapsing fever are described.

Two persons, one of whom was the author, exposed themselves to the bites of infected lice, precautions being taken against crushing of the insects. One of the persons became infected with relapsing fever. Excluding the possibility of infection through the excretum the author concludes that infection can take place through the bite of the insect. A previous experiment made under similar but not quite such accurate conditions, in which one out of eight persons exposed became infected, supports this view.

In serial sections of a louse infected nine days earlier, spirochaetes were seen entering the egg. Spirochaetes were also seen in considerable numbers in the walls and, not rarely, in the lumen of the oviduct. They were also found in the nerve tissues (ganglions), and in sections of the stomach wall made five hours after feeding they were seen

travelling towards the coelomic cavity. The author has, so far, not found them in the salivary glands. Referring again to the transmission experiments summarized above it is pointed out that one of the persons who became infected was bitten by lice which had been fed 25 days previously on a patient with relapsing fever. The author considers that the failures of infection by biting may be due to the fact that some of the lice had not been infected for a sufficient length of time for the spirochaetes to reach the salivary glands.

E J W

ARAVANTINOS (Anast) *Le rôle de la rate dans la fièvre récurrente* -
Ann Inst Pasteur 1919 June Vol 33 No 6 pp 425-435

The investigations described were undertaken with a view to ascertaining whether the presence of spirochaetes could be demonstrated in the spleen during all stages of the disease and their numerical relationship to those in the peripheral blood and whether the organism assumes in the apyrexial intervals some other than a spirochaetal form.

In a number of cases (which are set out in tabular form) films of spleen juice and peripheral blood were made at the same time during the first and second attacks of fever (9 and 12 cases respectively) and also in the apyrexial interval between them (66 cases). It was found that the spirochaetes were not at any time more numerous in the spleen than in the peripheral blood and, towards the end of the pyrexial attack, they disappear first from the spleen. At the beginning of the febrile period they make their appearance first in the peripheral blood. They are met with in greater number in the peripheral blood than in the spleen, where they are more numerous among the elements of the blood than among those of the spleen proper. During the first days of the apyrexial interval spirochaetes are not found in the spleen.

No signs of disintegration of the parasites and no granule forms were observed. No phagocytosis of spirochaetes was seen either in the blood or in the spleen.

Human inoculation of spleen juice was carried out with four volunteers. The material was collected on the 3rd or 4th day of the first apyrexial interval. The presence of spirochaetes in the peripheral blood of the patients who were subjected to spleen puncture was ascertained during their first and second attacks. The amount injected was 0.2 to 0.5 cc. Three of the volunteers had a rise of temperature of short duration 24 hours after inoculation (one of these failed to respond at first and was reinoculated 16 days later). The fourth had a transient pyrexia six days after inoculation. No spirochaetes were found in the peripheral blood of any of these cases. In order to show that this result was not due to a previously acquired immunity they were inoculated with a massive dose of blood from a case in which spirochaetes were demonstrated. Three out of the four developed a mild attack of relapsing fever from which it is inferred that the previous inoculations of splenic juice had produced a partial immunity.

The author lays stress on the safety of spleen puncture in relapsing fever and points out that the form of syringe recommended by him

for this procedure in kala azar [this *Bulletin*, Vol 8, p 405] is unsuitable in relapsing fever as the greater toughness of the spleen in this disease counteracts the working of the spring-actuated piston. He recommends the use of an ordinary syringe. No special precautions, either before or after puncture, are required.

E J W

CHIRIBOGA (Juan M.) *Primera descripción del tífus recurrente en el Perú, particularmente observado en el Departamento de Huancavelica* [First Account of Relapsing Fever in Peru with Special Reference to the Epidemic in the Department of Huancavelica]—*Crónica Méd*, Lima 1919 Apl Vol 36 No 670 pp 127-131

A description of an epidemic of relapsing fever in a department of Peru. The usual aetiological factors were present, viz, great poverty and want of hygiene among the inhabitants, who share miserable hovels with animals of all kinds, and accentuated deficiency of food and a profusion of lice. The author draws attention to certain special features of the symptomatology of the epidemic under his observation. Splenomegaly, hepatic enlargement, intense jaundice and epistaxis, features usually cited as of rare occurrence, were general. The course of the fever was benign, only one death occurring, that of a woman of 60 suffering from arteriosclerosis and an abdominal tumour.

F S Arnold

STERLING-OKUNIEWSKI (Stefan) *Beitrag zur Bakteriologie der Recurrensspirochaete, zugleich ein Beitrag zur Wirkung des Neosalvarsans auf Rückfallfieberkranke* [The Bacteriology of the Relapsing Fever Spirochaete and the Action of Neosalvarsan on Relapsing Fever Cases]—*Cent f Bakt* 1 Abt Orig 1919 Feb 28 Vol 82 No 7 pp 456-460

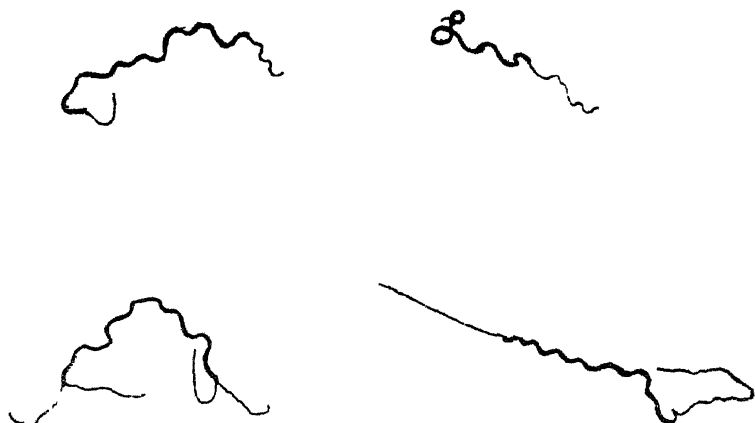
In the course of an investigation of 300 cases of relapsing fever during an epidemic at Lodz, it was noted that, as regards the morphology of the spirochaete, there were considerable variations in different cases with respect to length, thickness and number of curves, but that patients usually harbour organisms of the same type. The type may however vary in succeeding attacks. The number of organisms found in the blood in different cases is liable to wide variation and bears no relation to the severity of the illness. The spirochaete is stated to reproduce by transverse division, the whole process occupying (according to LUFT) 10-15 minutes. Rarely, longitudinal division occurs. Attempts to cultivate the spirochaete were unsuccessful. In many cases granules were observed in polymorphonuclear leucocytes similar to those described by PROWAZEK as occurring in typhus fever.

Some figures are given illustrating the curative effect of Neosalvarsan in relapsing fever.

E. J. W

BHANDARKAR (P R), PURUSHOTTAMSINGH BAIS, & BHAGWAT (S W)
Demonstration of Flagella of *Spirochaeta carteri*—*Indian Med Gaz* 1919 Sept Vol 52 No 9 p 327 With 1 plate

One or two flagella were demonstrated at one or both ends of *S carteri* [see illustration] by using the method of NICOLLE and MORAX



Spirochaetes of Indian Relapsing Fever, showing terminal flagella stained after NICOLLE and MORAX (After drawings by Mr PRATAPRAO, Artist, Indore from *Indian Medical Gazette*)

The technique is as follows

"Receive blood, from the pricked finger of a patient, in citrated normal saline solution, in the proportion of 1 in 10, and centrifuge. Place a drop of the supernatant clear fluid on a thoroughly clean glass slide, touch it with the end of another glass slide (with rounded edges), held at an angle, allow the drop to spread along the edge by capillary attraction, and draw the upper slide slowly towards the end of the lower slide in a direction away from the drop, so that the fluid follows the edge of the moving slide and is not pushed before it, dry in an and stain by method (iv) described at p 151 of Besson's *Practical Bacteriology* (Eng trans Hutchens 1913). After washing and drying, examine in cedar wood oil. If the preparation be satisfactory, put on a cover glass, thus mounting the specimen in oil. Protect from unnecessary exposure to light. As a rule the best fields of the preparation are those in which the background is almost colourless.

"The method requires some practice and care to ensure success, and all preparations are not equally satisfactory. The slides must be perfectly clean, and before use must be heated rather strongly by passing through flame and allowed to cool.

"Our later trials with van Ermengem's method have met with success, but the results so far have not been nearly as satisfactory as those with the method here described."

The staining method referred to is as follows —

Mounting—Place a large drop of fuchsin ink (without any addition of acid or alkali) on the film. (Composition of fuchsin ink: 25 per cent aqueous sol tannin, 10 cc, cold sat sol ferrous sulphate, 5 cc, sat alc sol fuchsin, 1 cc). Heat for ten seconds over the pilot flame of a Bunsen.

When steam begins to rise, pour off the solution, tilt the slide and run a gentle stream of water from a wash bottle on to its upper angle so as to wash the film well without washing the organisms away.

Repeat the mordanting and washing two or three times
Starving—Put a drop of carbol fuchsin on the film and heat once or twice until steam has been rising for fifteen seconds

E J W

WANHILL Relapsing Fever A Rough but Effective Method of Dealing with the Louse in India—*Jl Roy Army Med Corps* 1919 Aug Vol 33 No 2 pp 178-180

A very virulent epidemic of relapsing fever broke out in the 5th Mule Corps but was successfully stamped out. The whole of the huts occupied by the Corps were vacated and the men placed under canvas. The huts were left vacant for 13 days to cover the incubation period but disinfection was not possible on account of their structure. It was considered that the lice would in that time die of starvation. Reinfestation from natives in a neighbouring village was prevented by the placing of guards to keep it out of bounds. All the men of the unit were marched to the river twice daily where they washed themselves and their clothes. The clothes were then exposed to the sun on the hot sand and afterwards taken to some other spot and well shaken. The effect of sunlight and heat was to kill the lice and desiccate the eggs. Tents were turned inside out daily and exposed to the sun.

The patients' hair was dealt with by the usual methods and cut when caste permitted. Beyond men who had been infected in the huts prior to moving into camp, no further cases occurred.

Prophylaxis consisted in instructions to all units, describing the mechanism of infection by the louse, isolation and inspection of recruits and the cutting of their hair, thorough washing of men and clothes twice daily.

E J W

DALIMIER (R.) A propos de la broncho-spirochétose de Castellani — *Presse Médicale* 1919 Mch 10 Vol 27 No 14 pp 124-125

The appearance of the sputum in cases of bronchial spirochaetosis is characteristic. It is glutinous and is either finely streaked with blood or the blood is diffused through it. After standing, the blood in the former variety haemolyses and the mass of sputum presents the appearance of globules of yellow gummy matter immersed in gooseberry juice. In the latter variety the sputum gradually assumes a violet colour, resembling that of a crushed black cherry.

For the successful demonstration of the spirochaetes stress is laid upon the importance of examining fresh specimens. If several hours have elapsed since expectoration the result of microscopic search is almost always negative.

E J W

DARGALLO (Remigio) La espiroquetosis broncepulmonar de Castellani [Bronchopulmonary Spirochaetosis of Castellani]—*Rev Espanola de Med y Cirugia* 1919 June Vol 2 No 12 pp 323-325

A summary of the present state of knowledge concerning Castellani's *Spirochaeta bronchialis*. The histological and cultural characters

of the organism are described and an account given of the symptoms and physical signs of the acute and chronic forms of broncho-pneumonia for which it is responsible. Some notes on treatment and a bibliography conclude the article.

F S A

FARAH (Najib) Broncho-Spirochaetosis in Egypt—*Lancet* 1919
Oct 4 pp 608-609

The author records the occurrence of six cases of broncho spirochaetosis in Alexandria and claims to have obtained good results by treatment with injectable iodine.

E J W

KATSURADA (Fujiro), NAGANO (Kwanji) & TAKEMOTO (Sakae) Ueber eine Krankheit mit rekurrierenden Fieberanfällen (Febris recurrens pernicioso) und ihre Aetiologie. [On a Case with Recurrent Attacks of Fever (Febris recurrens pernicioso) and its Aetiology]—*Verhandl der Japan Path Gesellsch Tokyo* 1918 Apl 2-4 Vol 8 pp 136-137

A chronic case of recurrent attacks of fever was observed at Kobe and was named Febris recurrens pernicioso. The patient was a male, aged 38. He had been ill for about a year. The pyrexial attacks were of 5-7 days duration, the temperature standing continuously during the earlier stages of the illness at 38-40° C, with a slight further rise at night. Later, on account of complications, fever was almost continuous but the intervals between the attacks were always recognizable. The apyrexial intervals were 15-20 days. At each pyrexial attack there was swelling of the lymphatic glands with slight enlargement of the spleen and oedema of the face and legs. At the beginning of the illness the adenitis was confined to the cervical region, but in later attacks the axillary and inguinal glands were also involved. During the apyrexial intervals this adenitis disappeared almost entirely. There was anaemia and cachexia.

Spirochaetes resembling *S. duttoni* were found in the blood in small numbers and in sections of an inguinal gland. The authors are making further investigations as to the etiological relationship of the organism to the disease.

E J W

KUSAMA (Shigeru), KOBAYASHI (Rokuzo) & KASAI (Katsuya) The Rat-Bite Fever Spirochete, with Comparative Study of Human, Wild Rat, and Field Vole Strains—*Jl Infec Dis* 1919 Apl Vol 24 No 4 pp 366-375

Experiments were made to demonstrate the distribution in the animal body, the route of excretion, the mode of infection, the symptoms in the infected animals, and the immunity relations with respect to human, wild rat and field vole strains of the spirochaete.

The following are the conclusions at which the authors arrived—

“In the infected wild rat, white rat and guinea pig, the spirochete of rat bite fever, in the early stages of the infection, are detected principally in the blood, but after 2 weeks a large number appears in the

connective tissues, and as time goes on this number is gradually increased. That is, this spirochete is always distributed numerously in the subcutaneous and submucous tissues of the eyelids, lips, bridge of the nose, and tongue, and is especially abundant in the reticular connective tissue of the vascular sinus surrounding the follicle of the tactile hair of the upper eyelids and lips. It is also usually, if not always, found abundantly in the capsules of the salivary and lymph glands, in the heart wall, in the adventitia of the aorta and large arteries within the visceral organs, and sometimes in the endocardium of the heart. It can also be detected in the spleen, the liver, the adrenal glands, the kidneys, the parenchyma of the salivary and lymph glands, etc.

"The spirochete is neither excreted through the saliva from the salivary gland nor mixed into the saliva through the normal mucous membrane of the mouth cavity from its submucous source.

"The excretion of the organism in the urine is comparatively rare.

"The spirochete has never been detected in the intestinal contents of wild rats and guinea pigs or in the bile of guinea pigs.

"It is transmitted to a healthy animal through a wound caused by the bite of an infected animal and we have reason to believe that in order to be transmitted it passes from the submucous source or from the circulating blood, through an abrasion in the mouth, such as frequently occurs in the wild rat at the time of the bite.

"By keeping the infected and healthy animals in the same cage, we found no positive case among 11 guinea pigs and only two positive cases among 29 mice. These two positive cases might have resulted from the bite of the infected mice. So it is doubtful that this spirochetosis can spread among the animals merely by their living together, and it is also doubtful that transmission can take place by means of such ectoparasites as lice, fleas, mites, etc.

"By feeding experiments, we could find only two positive cases among 14 guinea pigs, and four among 29 mice, so that it is natural to suppose that the infection in the positive cases resulted from an injured surface in the alimentary canal rather than by transmission through the normal mucous membrane.

"By instillation of the infected blood into the eye, we proved only one positive case among 19 mice, and four among 14 guinea pigs. Thus it seems hardly possible that this organism enters the animal body through the normal conjunctiva, at least, in the case of the mouse.

"The Japanese monkey, guinea pig, wild rat, white rat and mouse are susceptible to all three strains of this spirochete. The infected guinea pig shows the rise of temperature, decrease in weight, alopecia, etc., while the inoculated wild rat, white rat, and mouse are apparently healthy, in spite of the abundant increase of the organism in their blood. The monkey inoculated with the human or wild rat strain also shows the pyrexia of relapsing type, but if the field vole strain is used, there is no fever.

"The immune serum of the Japanese monkey treated with the human or wild rat strain exerts a spirocheticidal action on all three strains, while the field vole serum has only a slight action on the field vole strain, but none on the other two.

"The Japanese monkey, recovered from the infection, even if it be caused by the field vole strain, does not show any further symptoms after being reinoculated with the human strain.

"The spirochete under discussion does not undergo any considerable variation in virulence and immunizing power, in passing through the body of the human being, monkey, guinea pig, wild rat, white rat, mouse, etc., but in passing through the body of the field vole, it seems to decrease its toxophore and haptophore groups quantitatively.

"Our experiments prove that the human, wild rat and field vole strains all represent the same species.

"We believe the *Spirochaeta morsus muris* Futaki is, in all probability, similar to *Spirillum minor* Carter, *Spirochaeta laverani* Brühl, *Spirochaeta muris* Wenyon, etc."

DA MATTA (Alfr) **Sur la spirochétose hépato-rénale (spirochétose ictero-hémorragique) et son traitement**—*Bull Soc Path Exot* 1919 Mch Vol 12 No 3 pp 128-132

A case of ictero-hamorrhagic spirochaetosis is described, diagnosed by demonstration of the organism in stained films from the urine, successfully treated by endovenous administration of urotropine

The patient was 57 years of age and on admission to hospital there was generalized jaundice with vomiting, headache, pyrexia, a soft quick feeble pulse and muscle pains especially in the calves. The urine contained albumen, bile, and casts and was diminished in amount

A 10 per cent solution of urotropine in cold sterile distilled water was used. 20 cc were administered at each injection. Twenty injections were made with an interval of two or three days between each group of four. As soon as the excretion of urine became normal in volume, cutaneous injections of cacodylate of soda were given.

The patient was discharged cured after 54 days

E J W

YAMANO (W) [*Spinochaeta icterohemorrhagiae* Infections in Dogs and Cats]—*Saikingaku Zasshi (Jl of Bacteriology)* 1918 Jan 20 No 268 pp 61-62

[From Review by R G MILLS]

Dogs are susceptible to the disease and frequently die of it. The urine and faeces are said to be infectious during and after recovery and it is stated that spontaneous cases may be the means of spreading the infection.

Cats are not so readily infected, perhaps do not contract the disease spontaneously, but do excrete the spirochaetes in the urine in artificial infections.

E J W

NICOLLE (Ch) & LEBAILLY (Ch) **Recherches sur les maladies a Spirochètes du rat transmissibles au Cobaye Deuxième Mémoire.**—*Arch Inst Pasteur de Tunis* 1919 June Vol 11 No 1 pp 6-13

This paper is almost entirely a repetition and amplification of previous communications [this *Bulletin*, Vol 10, p 275, Vol 12 p 223, and Vol 13, p 276]

Two fresh experiments in immunity are described. 1. A guinea-pig was inoculated with the organs of a mouse, the mother of which had been inoculated, a considerable time previously, with the virus of infective jaundice. The guinea-pig did not become infected, nor did it acquire immunity. The organs of the mother mouse were subsequently proved infective to a guinea-pig. It is inferred that the foetal mouse had not become infected from the mother.

2. The organs of a foetal guinea-pig which had been taken from a mother dead of infective jaundice were inoculated into another guinea-pig. This latter animal was then found to be immune to subsequent inoculation.

Details are given of an attempt to conserve the virus in a leech fed on an infected guinea-pig. The blood contained in the leech was found to be infective for guinea-pigs but did not remain so for longer than when simply preserved in the ice-chest.

E J W.

HILDEBRANT (Wilhelm) Klinische und haematologische Untersuchungen eines Falles von Fünftagesfieber mit Spirochaetenbefund im Blute [Clinical and Haematological Investigations in a Case of Five-Day Fever with Spirochaetes in the Blood]—*Folia Haematologica* (Archiv) 1919 Mch Vol 23 No 3 pp 125-148

A case of five-day fever is described in minute detail. In addition to the usual manifestations there were well-marked rashes of an exanthematous character and pharyngeal inflammation during the attacks. Spirochaetes were found in the blood and cultivated.

Complete leucocyte counts were made daily for more than two months, the results of which are set out in tabular form.

E J W

IDO (T), ITO (K) & WAIH (S) [Experiments with the Spirochaete of Seven-day Fever]—*Tokyo Igi Shinshu* (Tokyo Med News) 1917 Dec 8 No 2053 pp 2531-2534

[From Review by R G Mills]

This is the second part of the paper of which the first part was summarised in this *Bulletin* Vol 12, p 418.

Infectivity of the blood of patients This was 100 per cent during the first 4 days, 33 per cent on the 5th, and 11 per cent on the 6th. Tests thereafter were usually negative. Small young guinea-pigs were found more suitable than older larger ones and the injections were made intra-abdominally. The organisms could sometimes be seen in stained blood smears from the patients.

Immune bodies Up till the 5th day the tests were uniformly negative. From the 6-7th day their presence was sometimes noted, and they occurred regularly about the 8-9th day. The organisms with the test serum were introduced into the abdomen of a guinea-pig and examined at the end of 2 hours. The lytic action was usually well marked.

Patients' urine After the 8th day the tests were sometimes positive and the number of organisms was occasionally great. A positive test was regularly obtained about the 18-25th day, and often persisted to the 39th day. The urine was centrifuged at high speed and a direct examination made, after which an animal was inoculated. The results obtained closely resemble those in infective jaundice.

The distribution of the disease in Japan is wider than was at first supposed. It is known also by the names "Shueki" (autumn disease) and "Saljushunetsu," or "Saku fever."

E J W

DE MELLO (Froilano) & MESQUITA (Roberto) *Spirochaeta Eurygyrata* Werner emend. Fantham dans les selles normales et cholériques à l'Inde Portugaise—*Bol Ger Med e Farmacia* Nova Goa 1919 Apl Vol 5 No 4 pp 164-167

The authors record the finding of *S. eurygyrata* in Nova Goa in cases of cholera [number not stated] and also in normal and diarrhoeic stools.

590 organisms from three of the cases of cholera were measured and the percentage results are set out in a table and compared with the figures of other workers (MACFIE, CROWELL & HAUGHWOUT) Similarly the results with 200 organisms from each of two non-choleraic cases are tabulated

E J W

YELLOW FEVER

NOGUCHI (Hideyo) **Etiology of Yellow Fever VII Demonstration of *Leptospira Icteroides* in the Blood, Tissues, and Urine of Yellow Fever Patients and of Animals Experimentally Infected with the Organism. VIII Presence of a *Leptospira* in Wild Animals in Guayaquil and its Relation to *Leptospira Ictero-haemorrhagiae* and *Leptospira Icteroides* *Jl Experim Med* 1919 Aug 1 Vol 30 No 2 pp 87-93 95-107**

For the author's previous contributions on the etiology of yellow fever see this *Bulletin* Vol 13, p 250 and Vol 14, pp 221-4

VII The following is the author's summary of his investigations [The first part of the paper, dealing with the demonstration of *Leptospira icteroides* in the blood, tissues and urine of yellow fever patients is described as a preliminary account]

'Examinations of fresh blood from yellow fever patients by means of the dark field microscope made in more than twenty seven cases revealed in three cases the presence of *Leptospira icteroides*. In no instance was a large number of organisms found, a long search being required before one was encountered. The injection of the blood into guinea pigs from two of three positive cases induced in the animals a fatal infection, while the blood from the third positive case failed to infect the guinea pigs fatally. Careful but by no means exhaustive dark field searches for the leptospira with fresh specimens of blood from the remaining cases of yellow fever ended without positive findings, although some of the specimens, when injected into guinea pigs, caused a fatal leptospira infection.

Stained blood film preparations from the corresponding cases were also examined, but the percentage showing the leptospira in the blood was no greater than that found by examination in the fresh state with the dark field microscope. In fact owing to the defective stains that were available at the time of the investigation a great many slides did not take the proper coloration with Giemsa's or Wright's stain and could not be relied upon.

'Regarding the presence of *Leptospira icteroides* in various organs both dark field and stained films were examined. In only one instance so far a few organisms were detected in the emulsion of liver taken shortly after death from a case dying on the 4th day of yellow fever. This part of the work will be reported later upon completion.

'Examinations of the urine from different cases of yellow fever were made both by dark field microscope and by inoculation into guinea pigs. The results were totally negative in thirteen cases including in my convalescents, but in one case one of the guinea pigs inoculated with 10 cc of the urine came down on the 15th day with suggestive symptoms (suspicion of jaundice, and some hemorrhagic and parenchymatous lesions of the lungs and kidneys). This specimen showed no leptospira by dark field examination.

'In experimental infection of guinea pigs with *Leptospira icteroides* the blood became infective in many instances 48 hours after inoculation and was always infective after 72 hours. The liver and kidney become infective simultaneously with the blood. Detection of the organism by means of the dark field microscope has seldom been accomplished before the 5th day. The organisms are most abundant on the 6th to the 7th day, but become fewer or completely disappear before death. In the mean while the number of organisms increases in the liver and kidney, from which they disappear as the jaundice and other symptoms become aggravated. When death occurs these organs seem to have lost most of the leptospira, and positive transfer by means of them is less certain. At the later stage of the disease the blood is often free from the organisms and ceases to be infective. Positive transmission with blood obtained from moribund animals is not impossible, however, even when no leptospira can be detected under the dark field microscope."

As regards the urine examination it is stated that "the investigation was much handicapped by the lack of a powerful centrifuge to concentrate the urine, and it will have to be repeated under more favourable conditions"

viii The animals subjected to investigation for the presence of leptospira were rats, mice, bats, and an opossum. The following is the author's summary of his experiments —

"By the inoculation of guinea pigs intraperitoneally with the emulsions of kidney from wild rats and mice captured in Guayaquil, it was found that 67 per cent of the wild rats tested harbored in their kidneys a leptospira which produced in guinea pigs symptoms and lesions identical with those produced by *Leptospira icterohaemorrhagiae* derived either from patients suffering from infectious jaundice in Japan or Europe, or from wild rats caught in New York

"Immune sera were prepared in rabbits by injecting different strains of the Guayaquil leptospira. These sera had a marked agglutinating and disintegrating influence upon the homologous strains, and also, but often to a less pronounced degree, upon the strains of *Leptospira icterohaemorrhagiae* from other sources. Pfeiffer's phenomenon was also found to be positive, and protection was demonstrated against infection with virulent cultures of strains of *Leptospira icterohaemorrhagiae*

"The same sera had no effect, or at most a very slight one, upon *Leptospira icteroides*. Guinea pigs inoculated with *icteroides* strains were not noticeably protected by the use of the immune sera prepared with the Guayaquilrat strains

"Guinea pigs inoculated with killed cultures of the Guayaquil strains of leptospira proved to be resistant to a subsequent infection with heterologous as well as homologous strains of *Leptospira icterohaemorrhagiae*

"It is concluded, therefore, that the leptospira isolated from the kidneys of wild rats and mice in Guayaquil belongs to the group of *Leptospira icterohaemorrhagiae*, and differs from *Leptospira icteroides* in its immunity reactions

"No positive transmission was obtained with kidney material from bats and an opossum"

E J Wyle

NOGUCHI (Hideyo) Etiology of Yellow Fever ix Mosquitoes in Relation to Yellow Fever — *Jl Experim Med* 1919 Oct Vol 30 No 4 pp 401-410

The investigations described were undertaken in order to ascertain whether the behaviour of the organism isolated from yellow fever cases (*Leptospira icteroides*) in relation to mosquito transmission conformed to the known characteristics of the yellow fever virus

A detailed description is given of thirteen, out of a large number of experiments in transmission with *Stegomyia calopus* from man during the first days of the disease to guinea-pigs, and from one guinea-pig to another. The method adopted was to expose the infected person or animal to the bites of a large number of *Stegomyia* which had been hatched from larvae in captivity and allowing the insects to feed until most of the females were engorged with blood. The tests for infectivity were usually made two weeks after the feeding on the patients but sometimes earlier, and consisted in allowing a dozen or more of the mosquitoes to bite one and sometimes two animals at the same time

Although, among a large number of attempts, the positive transmission results are few these

"are sufficiently conclusive to establish the main point that this mosquito may serve as an intermediary host of *Leptospira icteroides*. The term intermediary host, however, is not used here in the sense understood in the case of certain protozoan organisms, which require an extrinsic host in which to pass their life cycle, but denotes that a certain length of time is necessary for multiplication of the organisms to such numbers that the mosquito may transmit enough to produce infection.

From the biological and cultural properties of the organism this hypothesis seems reasonable, though the possibility of a stage of development in the mosquito has not been excluded."

Dark ground examination of an emulsion of mosquitoes, the bites of which had produced a fatal infection in a healthy guinea-pig from an infected animal, showed the presence of *Leptospira* and smearing the mosquito emulsion over the scarified skin of a normal guinea-pig also produced infection.

"Monkeys and infected as well as normal guinea pigs, when not allowed to defend themselves are eagerly bitten by the extrinsic stegomyias. Rats, however are seldom bitten by these mosquitos and bats have never been seen to be attacked when placed in a cage with hungry stegomyia females."

The following is the author's summary of his experiments —

"The foregoing experiments show that symptoms and lesions closely resembling those of yellow fever in man may be induced in guinea pigs by the bite of female stegomyias that have previously sucked the blood of a yellow fever patient or of an animal experimentally infected with *Leptospira icteroides*. With mosquitoes infected directly from a yellow fever patient the infectivity seems to become manifest after a longer period of incubation than with those infected with the animal blood. In the former, at least 12 days are said to be necessary before they become infectious and this hypothesis seems to be borne out by the present experiment. On the other hand, the mosquitoes which were engorged with the infected blood of the guinea pig were found to be capable of transmitting the disease within 8 days after this feeding. This discrepancy may be explained by the fact that the number of leptospira existing in experimentally infected guinea pigs is far greater than that in human blood.

"The frequency with which positive transmission by the stegomyia was obtained in both instances was very small indeed, in view of the number of mosquitoes employed. It appears that even under natural circumstances the percentage of mosquitoes that eventually become infected with the yellow fever microbe by sucking the blood may be very small. It has already been shown by previous investigators that to transmit yellow fever from a patient to a non immune person requires from 0.1 to 2 cc of blood at the height of disease. According to my estimate a female stegomyia may take up 0.01 cc or even less. Apparently a mosquito occasionally becomes infectious by taking up the one or two organisms which happen to be circulating in the peripheral blood of man, and it is these occasionally infected few which carry the disease. It is not difficult to realize the extent of ever increasing danger from a constant supply of the microbic virus which an endemic center or an epidemic of yellow fever can provide. One infected mosquito may mean many patients and the life of such a mosquito is usually longer than that of the persons whom it fatally infects.

"Finally, it is of interest to note that the development and maintenance of *Leptospira icteroides* are indispensably associated with the blood constituent, the serum, and this is amply supplied by the blood sucking insect. The organism is one of the most fragile of all the pathogenic parasites and cannot survive the concurrence of other less fastidious organisms such as bacteria. The comparatively aseptic body

cavity of the stegomyia* furnishes a secure shelter for the parasite which undoubtedly penetrates the zone of safety as soon as it is taken into the stomach of the insect. Unlike many other parasites this organism is capable of penetrating the intact skin or a bacteria proof filter and hence it is probably an easy matter for it to pierce the tissue of the visceral organs of the mosquito. Whether or not *Leptospira icteroides* can survive and multiply only in the body of *Stegomyia calopus* and not in other species or genera is yet to be determined. Another interesting fact with regard to the extrinsic life of this organism is that it can multiply readily at a temperature from 18-37° C. The optimum temperature, at which it remains viable for many months, is 26°. The climate in most of the tropical countries offers optimum conditions both for *Leptospira icteroides* and for the mosquito which carries and nourishes it.

E J W

*This refers to the presence of bacteria and not certain higher plant parasites (yeast, moulds, etc), or protozoa which have been occasionally found in stegomyia mosquitoes. These non bacterial organisms may exert no adverse influence upon *Leptospira icteroides*.

UNDULANT FEVER

NÈGRE (L) & RAYNAUD (M) 1 **Chauffage du sérum dans le sérodiagnostic de la fièvre ondulante** — *Bull Soc Path Exot* 1919 Apl Vol 12 No 4 pp 171-172

11 **Race de *M paramelitensis* isolée par hémoculture** *Ibid* pp 173-174

1 Previously the authors have reported that by heating the serum of melitensis infections in animals for 20 minutes at 57° C, the non-specific agglutinins were cut out, but VALLET and RIMBAUD though recognising this fact considered that by this action in some cases the specific agglutinins were also destroyed. The authors now give results of the examination of four cases in which the organism was isolated by blood culture, and which showed the thermostabile character of the specific agglutinins to be similar in man and in animals

Case	Heated serum	Unheated serum
1	1/500	1/500
2	1/500	1/500
3	1/500	1/500
4	1/100	1/100

11 The original paramelitensis organism was isolated by BRUCE and had been preserved by NICOLL. A similar strain was isolated from the milk of a goat by SERGENT (E), GILLOT, and LEMAIRE in 1907 which they called *M pseudomelitensis*. In 1913 BASSETT SMITH reported a case from the south of France and LABONNOTTE and DELANOE more recently one from Mazagan in which the blood agglutinated the paramelitensis alone or in higher dilutions than the *M melitensis*.

The authors now report a case in which the organism was isolated from the blood, and gave the following reactions

	Melitensis	<i>Coccus</i> Paramelitensis	Strain isolated
Anti melitensis serum	1/100	1/50	1/100
„ para „ „	1/50	1/500	1/500

The agglutination reactions with the patients' serum were

	After 1 hour	After 6 hours
<i>M melitensis</i>	1/100	1/100
<i>M paramelitensis</i>	1/200	1/500
Strain isolated	1/1 000	1/5 000

The heated and unheated serum gave similar readings

The authors conclude that they have isolated from the blood of a case of undulant fever a strain of *M paramelitensis* which by its agglutination characters takes an intermediate position between the *M melitensis* and *M paramelitensis*

P W Bassett-Smith

SERGENT (Edmond) & LHÉRITIER (A) **Essais de sérothérapie dans le fièvre ondulante** — *Ann Inst Pasteur* 1919 May Vol 33 No 5 pp 336-343 With 2 charts

The anti melitensis serum was obtained from horses inoculated either (1) Intravenously with living organisms, (2) subcutaneously with living or dead organisms, (3) subcutaneously with an endo-toxin obtained from macerated dead organisms. Many strains of the

Micrococcus should be used, including para- and pseudo-melitensis forms. Details of cases treated by different medical men are given in support of the various forms of preparation, but in a few cases the sera were ineffective, and the authors state that it is possible that in these refractory cases the organisms differed from the nine strains used by them, but that they had no opportunity of testing this.

The conclusions arrived at were

(1) The serum obtained after subcutaneous inoculation of either living or dead organisms was ineffective

(2) Good results were obtained in most cases when the serum had been obtained after intravenous inoculations, or after the use of their endo-toxin preparation, the last method having the advantage of being less dangerous to the operators on the animals. In these cases the horses were inoculated intravenously with the freshly killed organisms, and under the skin with the endo toxin.

(3) The dose of serum to be used is 50 cc on three following days

(4) When effective, the pains are relieved and the fever falls in a few days with a feeling of general improvement. It is useful in chronic as well as in acute cases

(5) The treatment with inoculations of a dead vaccine (800 millions per cc) was also effective in one case quoted, commencing with a dose of 0.25 cc and followed by a second of 0.5 on the 8th day

P W B-S

MEYER (K F), FLEISCHNER (E C) & SHAW (E B) **The Pathogenicity of *Bacterium Melitensis* for Guinea-Pigs**—*Proc Soc Experim Biol & Med* 1919 May Vol 16 No 8 pp 152-156

The close relationship of *B abortus* (Bang) to *B (Micrococcus) melitensis* as demonstrated by EVANS (A C) [see this *Bulletin*, Vol 12, p 379], was confirmed by the authors. In addition they showed that the cutaneous hypersensitive reactions of the two were similar, and also in a number of guinea pigs when injections were made with the *Melitensis* organism into the testicle, that a disease was produced with pathological changes which could not be distinguished from those in guinea pigs suffering from abortion disease. These were, very large spleen, general lymphatic enlargement, liver and lung lesions with infiltrations of epithelioid and lymphatic cells, a differential diagnosis being only possible by cross agglutination and absorption tests.

P W B-S

PAPPATACI FEVER, DENGUE AND UNCLASSED FEVERS OF THE TROPICS

MEGAW (J W D) **Sandfly Fever and its Relationship to Dengue.**
Indian Med Gaz 1919 July Vol 54 No 7 pp 241-247

The confusion with regard to the fevers of short duration that exists at the present time is again discussed by the author, who ten years ago was emphatic on the single character of these diseases, an opinion he still holds. He gives a long series of quotations from modern writers to prove that neither the duration of the fever nor presence of rash are reliable data as means of differentiation, but it is difficult to agree with him in his objection to the opinion of BONNE, who "*considers it advisable to separate these dengue like fevers from true dengue until the causative organism is found and differentiation made more easy*" [So far, the only true scientific data go definitely to prove that there is one fever, generally of short duration, in which phlebotomus act as the carrier, and a second generally of longer duration having either a culex or stegomyia as the carrier of infection. This would appear to give sound reason for accepting the duality of the diseases, apart from the actual recognition of the virus as yet unknown. The terminology of three, five and seven day fever has always been unsatisfactory and the sooner it is dropped the better, as also that of Mediterranean dengue. Further experimental research is required with regard to immunity and whether the same disease can be carried by both phlebotomus and mosquito by further experimental tests on non-immune and immune persons.]

P W Bassett Smith

WEINBERG (M) **Pappatacifeber und Influenza** — *Arch f Schiffs- u Trop-Hyg* 1919 July Vol 23 No 15 pp 331-337

The author describes very clearly the general characters of sandfly fever and influenza, and shows how closely in clinical characters they agree but though superficially so alike careful observation reveals distinctions. DORR in his original work on phlebotomus fever noted the great difficulties in diagnosis. The author in his description states that at the time he was speaking (in July 1918), the influenza pandemic (in Turkey) had appeared on the top of a usual epidemic of phlebotomus fever and the two diseases were thus easily contrasted. The points he strongly emphasises are, the extreme rapid onset and quick rise to its maximum of phlebotomus fever with the intensity of the constitutional symptoms rendering the patient almost immediately mentally and physically hors de combat, the greater intensity of the pains affecting particularly the ocular muscles, the greater injection of the conjunctiva and rarity of involvement of the respiratory tract. There is a more rapid dissemination of the disease and generally the evidence of the puncture marks of the flies and their presence in great abundance in the locality. Relapses occur in about 10 per cent but immunity is almost absolute. Blood examinations are diagnostic factors secondary to the clinical characters, but are useful. The lymphocytosis and leucopenia are much more marked in sandfly fever than in influenza.

P W B-S

ADELMANN (Edgar) Beitrag zur Kenntnis des Papataciefiebers.
 [Contribution to the Knowledge of Pappataci Fever]—*Arch f Schiffs- u Trop-Hyg*, 1919 Mar Vol 23 No 5 pp 81-99
 With 7 charts

The observations were made during the years 1916-17, with the German section in the Dardanelles. The carrier was recognised to be the *P papatasu*, called by the Turks "the little tartar". These were most active between the middle of May and the middle of October. The fever was prevalent during the same months. It commenced about a week after the appearance of the flies and ceased when they disappeared. The incubation period was 3-4 days, the fever was short, about 2½ days, but in isolated cases it was much prolonged with a secondary rise. The symptoms were of the usual type with marked conjunctival congestion and eyeball pain. The essential diagnostic points were, a three day fever with fall by lysis, slow pulse, absence of rigors, and the remarkable reddening of the eyes. It is noted that one attack almost always gave immunity to the soldiers. No prophylactic or curative treatment was of any use.

P W B-S

LOUGHNAN (W F M) Seven-Day Fever—*Jl Trop Med & Hyg*
 1919 June 16 Vol 22 No 12 pp 114-116 With 3 charts

The author considers that seven day fever as described by ROGERS is a well defined disease and occurs endemically in British Arabia. He describes the clinical symptoms in detail and gives charts showing two types of pyrexia, that with a regular continued fever and one with the saddle back type of curve. It has to be differentiated from malaria, dengue, enterica, relapsing fever, sandfly fever, and influenza, and it is frequently returned as P U O and a series of statistics are given showing that the greatest incidence occurs in the months from May to October. In 1909, there were 87 cases having a duration of 1-4 days and being probably sandfly fever, and 49 with 5-7 days which was characteristic of seven day fever, several of these occurred between October and April. No direct connection with prevalence of mosquitoes was made out. During 1911 and 1912, seven day fever was not prevalent amongst the British troops at Aden.

P W B-S

FRANCIS (Edward) Deer-Fly Fever, or Pahvant Valley Plague. A Disease of Man of Hitherto Unknown Etiology—*Public Health Reps* 1919 Sept 12 Vol 34 No 37 pp 2061-2062

In Millard County, Utah, a disease of a septic type supposed to be conveyed by a deer fly has been recognised during the past three years, about twenty-four cases have been recorded with one death.

The infection can be transmitted from an acute case to guinea-pigs and rabbits through the blood, or pus from suppurating glands. Subinoculation from these animals reproduced the infection. By culture on egg media a small non-motile coccobacillus was isolated which when inoculated into guinea-pigs caused a similar infection.

The author considers the organism isolated by him to be the same as that obtained by MCCOY and CHAPIN (1912) from the plague-like disease of ground squirrels and termed by them *Bacterium tularense* [see this *Bulletin*, Vol 5, p 156]

P W B-S

JAPANESE RIVER FEVER

KAWAMURA (R), KATTORI (T), OHMORI (S), & YAMAGUCHI (S)
[Tsutsugamushi Disease (Japanese River Fever), Studies on the
Pathogenicity]—*Chuo Igakka Zasshi (Jl Cen Med Assoc)*
1918 Jan 15 No 136 pp 119-22

[From Review by R. G. MILLS]

The authors found that though the infecting agent for tsutsugamushi (Japanese River Fever) could not be demonstrated, yet its presence was definitely proved to exist in the blood during the incubative and febrile stages. The minimum dose which could infect monkeys was 0.01 cc, while 1 cc always caused the disease. The agent did not pass through a Berkefield filter (type not stated) and appeared to be connected in some way with the cellular constituents. Fluid from painful lymphatic glands was infective, but negative results were obtained when using blister fluid, cerebrospinal fluid, fluid from the umbilical cord, and urine. The infectious agent in the blood is easily destroyed by heat at 50° C for 10 minutes, freezing, desiccation, and by antiseptics. Blood kept in the incubator for a week was sterile and the active agent is stated to die a few hours after the death of the patient. Immunizing experiments were unsuccessful, not preventing relapses. Guinea-pigs, black rats, and rabbits were immune.

Salvarsan was useless for treatment.

P. W. Bassett-Smith

KAWAMURA (Rinya) Ueber die Veränderungen der hamatopoetischen Organe bei den Tsutsugamushi-Kranken [On the Changes in the Blood Making Organs in Tsutsugamushi Disease]—*Verhandl der Japan Path Gesellsch Tokyo* 1918 Apr 2-4 Vol 8 pp 146-147

The chief changes are found in lymph glands and spleen and a distinct leucopenia is present. The author made researches on five cases, the lymph glands, adenoid tissue, spleen and bone marrow showed—(1) Abnormal growth of plasma cells, (2) Necrosis. This occurred in different degrees and was most distinct in the glands near the site of puncture, as a broad band under the capsule, it was often distinct in the deep glands and spleen. In convalescent cases the hypertrophic change had stopped, plasma cells being few but large lymphoid and phagocytic cells distinct. Definite necrosis was rare, and observation showed that the virus was not passed through the placenta to the foetus.

P. W. B-S

KAWAMURA (Rinya) Pathologische Befunde bei mit Tsutsugamushi-nox infizierten Affen [Pathological Changes in Infected Monkeys from Tsutsugamushi Virus]—*Verhandl der Japan Path Gesellsch Tokyo* 1918 Apr 2-4 Vol 8 pp 148-149

Eight monkeys were infected with the blood of patients and other diseased monkeys, these died in different stages of the disease, but without complications. Efficient controls were used.

There was (1) An increase in the large lymphoid and plasma cells, with little increase in the interstitial tissue, (2) Retrogressive changes and necrosis, chiefly in the lymphatic glands and liver. The pathological evidences were very similar to those found in man but were somewhat less marked.

P W B-S

NAGAYO (Mataro), MIYAGAWA (Yoneji), MITAMURA (Tokushiro) & TAMIYA (Takeo) *Ueber den Nachweis des Erregers der Tsutsugamushi-Krankheit im Leibe des Tsutsugamushi-Muttertiers* [On the Virus of Tsutsugamushi Disease in the Body of the Adult Mite]—*Verhandl der Japan Path Gesellsch Tokyo* 1918 Apl 2-4 Vol 8 pp 142-144

The virus is well known to be transferred by the larval mite to monkeys and other animals but how it becomes infected is still uncertain. Field mice in the infected district carry the larvae without themselves becoming infected, but as the larvae only take blood once in each stage it is hardly possible that the disease is transferred directly from field mice to man, or that the larva from the infected soil spread infection, as at the time of its attack on warm-blooded animals it is very small and shows no sign of earlier nourishment. It is highly probable that the virus in the larval form is acquired from the adult and it is debatable whether the virus contained in the mother mite is in the same form as in the larva, possibly it is in a special state of development and non-pathogenic. The injection of an emulsion of 200 mites into a monkey was without result. By further research the authors established the fact that the adult mite is the "carrier" of the germs, 400 after being emulsified and rubbed down in physiological salt solution after filtration through paper were injected into two monkeys. One animal remained well, the other developed symptoms of the disease after 10 days incubation. The blood of the animal after eight days sickness had no action on immunised animals. This monkey recovered and was subsequently immune to a strong virus. In 1917-18 a large number of mites treated as above were injected into five monkeys, 2 became ill after 10-14 days incubation. With blood taken on the fourth day of the sickness, two monkeys were injected with 0.5 cc, after 7 days incubation both showed signs of the disease and were immune to further injections of the virus.

It cannot therefore any longer be doubted that the adult Tsutsugamushi contains the cause of the disease and in a virulent form, although the virus is not so abundant in them as in the larvae.

P W B-S

NAGAYO (Mataro), MIYAGAWA (Yoneji), MITAMURA (Tokushiro) & TAMIYA (Takeo) *On the Cultural and Biological Properties of the Micro-Organisms Isolated from Cases of Tsutsugamushi Disease*—*Verhandl der Japan Path Gesellsch Tokyo* 1918 Apl 2-4 Vol 8 pp 144-146

The authors give an account of further investigations of the micro-organism which was isolated by them from the blood of two patients and monkeys suffering from Tsutsugamushi disease. This organism

is a facultative aerobe and grows between temperatures of 33–37° C, morphologically it is coccoid, from 0.4 to 2.0 microns. It does not form spores nor have a capsule and is non motile, it is killed by a temperature of 55° C and easily by disinfectants, it does not pass through a Berkfield filter V. Culture is at first difficult and growth was only obtained on Loeffler's serum, but when once acclimatised growth is much more easy and profuse. The virulence to monkeys is not strong, ten were inoculated subcutaneously and intraperitoneally, three showed moderate fever but none died, one of these was subsequently immune to a strong virus. The organism can be agglutinated by the serum of recovered patients and monkeys, complemental tests were slightly positive generally, but in one it was strongly positive. The serum of rabbits which had been inoculated with large doses of the organism contained highly agglutinative, and complement fixing substances to the antigen.

P W B-S

HAYASHI (Naosuke) & MUKOYAMA (Takayuki) *Eigene Forschungen ueber die "Tsusugamushi"-Krankheit im Jahre 1917* [Research on Tsutsugamushi Disease in 1917]—*Verhandl der Japan Path Gesellsch Tokyo* 1918 Apr 2–4 Vol 8 pp 141–142

For prophylaxis a cloak covering the whole person except the hands and face is used, the uncovered parts are smeared with a 2 per cent disinfectant solution which kills the mites in a few minutes. The puncture bites must be cut out quickly. Serum of cattle and monkeys, which had recovered from the disease, employed therapeutically was successful when used in the early stage of seven cases. The exciting cause appeared as rod like granules, morphologically like those which cause American Coast Fever found in the lymph cells of the glands. These have also been found in the infected organs of monkeys, guinea-pigs and rabbits and are not found in other diseases. Cultural experiments by NAKANO were negative.

P W B-S

MIYASHIMA (K) & OKUMURA (T) [*Trombidium akamushi* and Similar Forms from Japan, Korea and Formosa]—*Saikingaku Zasshi (Jl of Bacteriology)* 1917 Nov 10 No 266 pp 893–908

[From Review by R. G. MILLS]

In Korea the material was obtained from the ears of wild rats (*Apodemus agrarius*), caught in the Kyungki province. 124 mites were found and these could be divided into two groups by the length and branching character of the hairs. (1) Large haired form, 112 specimens. (2) Small haired forms, 12 specimens. Details and plates of these are given.

In Japan in the Nigata province the proportion was 1,181 small haired to 656 large haired, but a previous catch of 33 specimens in Yamagata province during April gave all large haired forms except one. TANAKA has called attention to two forms of red mites, one of which was common in wild rats, this he considered to be separate from those which are known to carry "flood fever." He says "the hairs on the posterior extremity of the wild rat form are very large and

have numerous side-branches, while those from the tsutsugamushi are very slender and have very short side branches," evidently identifying the two forms with those mentioned above. Most of the material collected from the human body, wild rats, and monkeys taken in infected districts has been of the small haired variety. This dogmatic statement of TANAKA that the small haired form was the only true carrier of the disease is disputed by NAGAYO, and MIYASHIMA claims to have produced the disease in monkeys with red mites reared by him from eggs of the *wild* rat type. The latter states definitely that the forms are really one and the same species. Further examination by the authors of 1,539 specimens failed to find any intermediate forms. Either there are two distinct species or there is a clear dimorphism, and the latter view is adhered to. The following table is given of seasonal incidence in Nagata, Japan.

	Small Haired	Large Haired
June 3	6	23
June and July	207	33
August 21	278	0
September 13	14	0
August and September	676	0

A summary of the specimens collected in Formosa, Korea and Japan during the spring months gives interesting data.

Place	Season	No of Specimens	Small Haired	Large Haired
Korea	April & May	124	12	112
Japan	April	33	1	32
Formosa	June	145	144	1

Both kinds occur together in each place so that local differences were probably not important. The conclusions therefore claimed are that the small haired form occurs as a result of seasonal dimorphism in the hot climate of Formosa and in the hotter portion of temperate Japan and Korea. The authors were not able to determine any specific differences between the *Leptus autumnalis* found in Formosa and the form described by HIRST in England. *Trombicula mediocris*, Berlese, found in Formosa, is nearly related, and a Javanese form is distinguished by having white hairs, thus differing very decidedly from the *Trombidium akamushi*.

P W B S

HAYASHI, MUKOYAMA and OSHIMA [Tsutsugamushi Disease]—
Japan Med World, Tokyo 1919 June 29 [Summary in
Jl Amer Med Assoc 1919 Aug 9 p 454]

The authors collected as many of the suspected mites as possible from one infected area and they found three different forms, but only one was able to give infection to the host. They not only infest field voles but also domestic fowls and a bird, *Acrocephalus orientalis*.

The latter are the most important as they favour the distribution of the disease over a wide area and make elimination most difficult, while the voles have a very restricted area and are more easily dealt

with The methods of prevention consist in (1) the use of overalls in field work, (2) the disinfection of the soil, (3) the application of insecticides to the exposed parts of the skin, (4) the extermination of the carriers of the akamushi, namely the birds, voles, etc

P W B S

BASILE (C) I a febbre fluviale al Giappone—*Policlinoico Sez prat*
1919 Aug 24 Vol 26 No 34 pp 1016-1018

The author gives a description of Tsutsugamushi disease mostly obtained from Japanese records, it contains nothing original

P W B-S.

SCURVY

LIND (W A T) **Some Interesting Details of an Outbreak of Scorbutus**—*Med Jl Australia* 1919 Aug 9 No 6 pp 107-108

Out of 360 patients in the Idiot Asylum at Kew, Victoria, 12 cases of scurvy occurred with 4 deaths, all were crippled children living with others in three cottages isolated from the remainder. These children were all hand fed, receiving invalid food, the remainder were served with a "mince diet" in a common dining hall. It is stated that the invalid diet was the same as that which had been served for years and that scurvy had never appeared before. The author considers that the timing of the onset in each ward suggested a contagious disease, which is however not very apparent.

Post mortem evidence showed extensive haemorrhages under the periosteum of the long bones and separation of the epiphyses.

Details of the twelve cases are given in the annexed table (p 29), with the dietary at the time of onset of the symptoms. The changes which were made in the dietary during the course of treatment, show the beneficial effect in most of the cases.

P W Bassett-Smith

WILTSHIRE (Harold) **Hyperkeratosis of the Hair Follicles in Scurvy**—*Lancet* 1919 Sept 27 pp 564-565

The author had the opportunity of observing over 3,000 cases of scurvy amongst Serbian troops and he noted that a peculiar hyperkeratosis of the hair follicles was a common sign, present in about 87 per cent.

It is most evident on the front and inner side of the thighs and the upper part of the legs, the hairs become wholly or partially destroyed, but by degrees the conical projection over the follicle becomes flattened down into a scale under which a new hair develops, the whole process takes place slowly and may last over many weeks. He concludes that (1) Follicular hyperkeratosis occurs in the vast majority of cases of clinical scurvy, (2) In a large proportion of cases it formed the first recognisable sign of scurvy and would enable a diagnosis to be made very early, (3) It is similar in appearance to the hyperkeratosis of follicles which occur in other states of malnutrition, (4) It appears to be due to altered nutrition of the follicle produced by simple deficiency of anti-scorbutic vitamins.

The condition has been described before in scurvy, but its importance as a diagnostic sign, and as a contra-indication for surgical operation has not been fully recognised.

P W BS

RANZEL (Felix) **Ueber chirurgische Folgezustände nach Skorbut**—[The Surgical Sequelae of Scurvy]—*Wien Klin Woch* 1919 Aug 7 Vol 32 No 32 pp 815-816

The observations were made on 370 cases of scurvy in Austrian soldiers returned from an endemic area in Russia where scurvy was present. The men showed conditions varying from slight pains in the

Name	Received	Ward	Age in 1918	Onset of Scurvy	Symptoms	Diet at Time of Onset	New Diet	Result
D O C	26 8 12	Male Hospital	Years 10	20 10 18	Left leg swollen and painful, mouth sore	Bread milk and rice	No special diet mouth wash	Died 24 12 18
R W C	26 3 14 Transferred from Nursery 27 18		8	27 12 18	Knee and ankle swollen, mouth sore	Rice sago bread and milk	28 12 18 Raw eggs raw milk lime water lemon juice 27 12 18 As above	Recovery Recovery
G McD	23 9 08 Transferred from Nursery 23 8 17 17 5 16		11	12 12 18	Mouth sore	Bread milk rice		Recovery
E J L			9	26 10 18	Gums and mouth bleeding, blotches on body	Bread milk rice sago soup	28 12 18	Recovery
W L	29 9 16 Transferred from Nursery 15 7 18		6	14 12 18	Left ankle swollen mouth sore	Bread milk rice sago	28 12 18	Recovery
S M V B O B	13 2 17 28 6 15	Female Hospital	9 12	20 12 18 8 10 18	Mouth sore Knee and legs swollen Gums sore	Bread milk rice Soup bread beet tea milk porridge rice sago Milk sago maizena rice	28 12 18 No special diet	Recovery Died 20 10 18
A G	10 4 06		18	10 10 18	Gums bleeding face left knee and right leg swollen	Milk beef tea maizena rice	27 12 18 Raw eggs raw milk lemon juice lime water 27 12 18 As above	Died 1 1 19 Recovered
I O M	1 11 11		12	7 10 18	Gums bleeding, ankles swollen	Porridge beef tea bread maizena milk	27 12 18 Raw eggs raw milk lemon juice lime water	Recovery
M C G	12 1 17	Nursery	5	2 11 18	Pains in legs Left shoulder and arm swollen spongy gums	Sago bread milk beet tea rice		Recovered
V M R	10 2 12		5	23 11 18	Gums swollen, gums spongy	Sago rice beef tea bread vegetables		Died 24 8 18
G C B.	13 3 16		5	21 8 18	Knee swollen			

legs to inability to stand due to contractions about the joints. He divides the cases into three groups (1) Twenty-two of 2-6 months duration. In these there was thickening with board-like hardness of the soft parts due to residual haemorrhages, greenish yellow spots round the hair follicles, contractures of knees and ankles with pain and difficulty in moving the joints. Radiograms showed no changes in the bones and superficial haemorrhages were rare. (2) Forty six cases, duration six months to one year. These were similar to the first group except that the parts often showed atrophy instead of increase in size, the soft parts were softer, sometimes oedematous, contractures were less fixed and movement of joints more possible with less resistance. (3) Twelve cases, duration six months to 1½ years. Contractures of the knees and ankles were the chief signs, the muscles are atrophied and the tendons stand out like cords, and cannot be corrected by tension. Etiologically these conditions are due to the excessive haemorrhages into the soft parts. When complete absorption occurs there are no late signs, but clotting and organization lead to contractions which may be mistaken for true ankylosis. The author believes that defective treatment in many cases led to the primary contractions and fixation of the joints.

Treatment of classes 1 and 2 consists of massage, baths, hot air, splints, etc., for several weeks, as the haemorrhages require a long time to absorb. Patience and gentleness is essential and operations are not required. In Class 3 operations are generally necessary, either tenotomy or in a few cases division of the muscles followed by extension and rest. The results of tenotomy have been excellent though many cases may only be able to get about on crutches for a year. He was not able to verify the observations of BRUNING as to the danger of haemorrhage following operation. He states that these sequelae are rarely referred to in standard works but the large number of scurvy cases due to war conditions have now brought them very much into evidence.

P. W. B-S

CAMPBELL (Mabel E. D.) & CHICK (Harriette) i **The Antiscorbutic and Growth-Promoting Value of Canned Vegetables** — *Lancet*, 1919 Aug 23 pp 320-322

CHICK (Harriette), HUME (E. Margaret) & SKELTON (Ruth F.) ii **The Antiscorbutic Value of some Indian Dried Fruits** (a) Tamarind, (b) Cocum, and (c) Mango ("Amchur") — *Ibid* pp 322-323

BARNES (Rosamund E.) & HUME (E. Margaret) iii **A Comparison between the Antiscorbutic Properties of Fresh, Heated, & Dried Cow's Milk** — *Ibid* pp 323-324

The experimental work relating to these three enquiries was carried out at the Lister Institute at the request of the Controller of Horticulture and Food Production Department and is a continuation of much useful research, some of which has already been published, to determine the amount of anti-scurvy accessory food factors in various substances commonly used.

i Cabbage and runner beans were the two vegetables chiefly investigated and it is shown that by canning the antiscorbutic value is reduced from 70 to 90 per cent by the heat used in the preserving.

process, for runner beans the value of 20g was reduced to less than 5g. Not only is there loss of value produced by the preparation but this continues during storage. The growth promoting accessory factor present in green vegetables is also to a great extent lost, but was present in the liquor. A useful table is given showing clearly the results obtained. Guinea-pigs were the animals used and to the basal diet free from anti-scurvy substances a certain amount of heated milk was added to supply the fat soluble growth factor.

ii Dried Tamarind, Cocum and Mango have the credit in India of possessing anti-scorbutic properties of considerable value, but no experimental study had been recorded with regard to them. Guinea pigs were again used as test animals, a basal diet of oats, bran and autoclaved milk was given and the various anti-scorbutic substances added.

The results are shown in a table. It was found that each of the three preparations possessed a definite but small anti-scorbutic value, less than raw cabbage, swedes, germinating pulses, oranges and lemon juice but equal or superior to carrots, beetroot, cooked potatoes and raw meat juice reckoned weight for weight.

iii The anti-scorbutic value of raw cows milk has in previous experiments by CHICK, SKELTON and HULME been shown to be much less than was generally accepted. The present investigation was carried out to determine the relative values of dried and raw milk.

Guinea pigs and monkeys were used and the dried milk was the commercial brand manufactured by the Just Hatmaker process. Two samples were employed, one less than three weeks old, the second six to twelve months old. The fresh milk was the best procurable. Great care was taken to prevent errors of observation and though eight monkeys only were used the conclusions arrived at seem to be justified. A table is given setting forth the details of the experiments. Cows milk even when fresh was found to be comparatively poor in anti-scorbutic properties and large quantities, 100-150 cc for guinea-pigs and 125-170 for monkeys, were needed to protect the animals from scurvy. Dried milk was very inferior, about half as effective as raw milk. Scalded milk was distinctly better than dry milk. The deductions following from these facts are suggestive for infant feeding. There was also evidence to show that winter milk is inferior to summer milk as a food. The growth producing accessory factor found in milk did not appear to be reduced in the process of preparation of dried milk, growth of the animals only falling off at the onset of scurvy symptoms.

P W B-S

GIVENS (Maurice H) & MCCLUGGAGE (Harry B) **The Antiscorbutic Property of Fruits 1. An Experimental Study of Dried Orange Juice—*American Jl Dis of Children* 1919 July Vol 18 No 1 pp 30-41 With charts**

It is well known that the juices of fresh fruits have a definite anti-scorbutic power and it is evident that if these can be prepared and stored in a dried form without loss of their active properties, the economical and health value of a very great amount of material at present wasted could be utilised. Guinea-pigs were used for

experiments and the basal diet consisted of soy bean flour, milk, yeast, paper pulp, calcium lactate and sodium chloride, mixed and dried into a cake. On this diet scurvy appears in about twenty days, if supplemented with raw cabbage, tomatoes or fresh orange juice, symptoms do not occur. Two methods of drying the orange juice were used: (1) in a "drier" at a temperature of 55°-60° for 36-60 hours, (2) The Merrell-Soule process as is used for drying milk, by means of a fine spray into a chamber heated to 75° to 80°, the juice is dried almost instantaneously by this method and falls to the floor remaining one or two hours. Careful records and good controls of the experiments, which were both protective and curative in character, were kept. The investigation proved that experimental scurvy in the guinea-pig can either be prevented or cured by the use of a small amount of dried orange juice, with the M S process a dose equivalent to 3 cc of fresh juice was sufficient as curative or preventive with the first method, in which the heating is longer, the equivalent was equal to 6.2 cc or more, and undoubtedly a part of the antiscorbutic vitamin was destroyed. The dried juice after three months storage remained active, but how much longer it will continue so is as yet unknown. The authors suggest that dried orange juice will serve as a convenient antiscorbutic for use in infant feeding, polar exploration, in the Navy and for soldiers during war.

P W B-S

GITTINGS (F C B) *Scurvy* — *Jl Roy Nav Med Serv*, 1919 July
Vol 5 No 3 pp 287-290 With 2 figs

In this article the author gives his views regarding the dietetic measures necessary to prevent and cure scurvy. He states that orange juice and potatoes have little or no anti-scorbutic value, and that fresh meat is of all things the most useful. He cites one case of an infant who had spongy gums and quotes extracts from Naval records dating back to Cook's time in support of this statement. Referring to CHICK's experiments and conclusions he points out that the results obtained from guinea-pig tests need not necessarily apply directly to man. [However, in contradistinction to his failures with orange juice, many positive and satisfactory results could be quoted as to the great value of fresh fruit juices. From arctic and other explorations it has been proved that a diet of fresh meat alone will prevent scurvy. The danger of over-cooking meat, particularly in ships, is one of great importance to remember. The dietetics for prevention of scurvy and allied diseases are still subjudice, and many factors have to be considered, but it is unwise to encourage the view that fresh fruit and vegetables are of little use.]

P W B-S

MCCARRISON (Robert) *The Effects of a Scorbutic Diet on the Adrenal Glands* — *Brit Med J* 1919 Aug 16 p 200

The author notes that the weight of the adrenals of guinea-pigs dying from the result of a scorbutic diet is roughly double that of healthy ones. These organs show haemorrhagic infiltration and disintegration of the cellular elements of the cortex and medulla. The changes

may be present in animals that show no clinical evidence of scurvy during life, they are then regarded as pre-scorbutic in character. The total quantity of adrenalin in these glands, which are double their normal size, is however less than half that found in healthy guinea-pigs. In healthy pigeons the total adrenalin per gram of gland is about ten times greater than that found in healthy guinea-pigs, but in these birds when on a food deprived of all accessory factors the amount of adrenalin becomes increased, thus differing from what occurs in guinea-pigs. The evidence so far available, both in birds and mammals, points to the dependence of the functional perfection of the adrenal glands on the adequate supply in the food of accessory food factors of all classes. In birds the want of the factors of A class (fat soluble) attended with an excessive production of adrenalin is associated with the occurrence of oedema, and in guinea-pigs the want of factors of the C class with diminished production of adrenalin is associated with haemorrhage into the body tissues.

P W B-S

HAPDEN (Arthur) & ZILVA (Sylvester Solomon) **Experimental Scurvy in Monkeys**—*Jl Path & Bact* 1919 May Vol 22 Nos 3, 4 pp 246-251

In the experimental study of scurvy guinea-pigs have been almost universally employed, but as the animals differ so widely from man in their anatomy and methods of life the authors were induced to substitute monkeys for their investigations, care being taken that the results were not complicated with production of incipient beriberi.

A diet was therefore given in which the anti-neuritic accessory factors both water soluble and fat soluble, were present.

Three distinct experiments were carried out. In the first the animal was fed on steamed wheat germ, autoclaved bread, monkey nuts and rice, with the addition of 100 cc of autoclaved milk, this contained an abundant supply of protein and anti-neuritic factors (tested on pigeons). The monkey also received 150 cc of fresh beer. The animal showed the first signs of scurvy in a little over three and a half months, it steadily got worse and was killed two weeks later, when the post-mortem showed evidences of an advanced stage of the disease.

In the second experiment the diet consisted of autoclaved rice, bread, and milk, one in which the anti-neuritic factors were practically absent. In 4½ months scurvy symptoms appeared and about a week later violent diarrhoea set in and the animal died. Post-mortem showed well marked scurvy, no evidence of beriberi was noted.

In the third experiment the diet was similar to that of No 1 but without beer. Marked scurvy symptoms again appeared in a little over 3 months, and increased. When the disease was apparently near its fatal termination, a cure was started and was quite successfully carried out. On the first day 25 cc of lemon juice, from which the free acids had been removed (equal to 100 cc of original juice), was given by a stomach pump and the same amount on the following day, improvement was then noticed and doses were given of the treated lemon juice, equivalent to 150, 250 and 130 cc of fresh juice. Five days after the commencement of the treatment the

animal was almost well and it continued on the same diet with 10 cc of lemon juice, on which it gained weight and appeared quite normal. Two months later it was killed, and no sign of scurvy was found.

The experiments are of great interest and show that scurvy can be produced in monkeys by a diet deficient in anti-scorbutic factor, and that the disease can be cured by addition of fresh lemon juice in *large quantities*. It is noted that the prophylactic use of fresh orange juice had also been demonstrated, a report of which experiments will be published later.

[The experiments of BARNES and HUME on monkeys fed on fresh, heated, and dried cows' milk, should be compared with the above.]

P W B-S

KUMAGAE (Kensaburo) Ueber den experimentellen Skorbut beim Meerschweinchen [Experimental Scurvy in Guinea-Pigs]—*Verhandl der Japan Path Gesellsch Tokyo* 1918 Apr 2-4 Vol 8 pp 119-120

Guinea-pigs fed exclusively on "Okara" very quickly developed scurvy, proved by anatomical and histological changes. Potatoes and "Satsuma," even when cooked, had marked anti-scorbutic properties. Rabbits on the contrary fed on "Okara" did not suffer. Green cabbage was always protective.

P W B-S

BENOIT (A) [Epidemic Scurvy]—*Paris Méd* 1919 Vol 9 No 24 p 469

The author reports an epidemic of severe scurvy which attacked 63 out of a body of 360 men. The duration was short clinically, and it subsided rapidly regardless of treatment or want of treatment. [It is highly probable that this was not true scurvy.]

P W B-S

SLEEPING SICKNESS

TAUTE (M) & HUBER (F) Die Unterscheidung des *Trypanosoma rhodesiense* vom *Trypanosoma brucei* Beobachtungen und Experimente aus dem Kriege in Ostafrika [The Differentiation of *T. rhodesiense* and *T. brucei* Observations and Experiments during the War in East Africa]—*Arch f Schiffs- u Trop-Hyg.* 1919 June Vol 23 No 11 pp 211-226 With 2 maps

In this paper the author re-opens the discussion which raged during the years 1913 and 1914, concerning the identity or non-identity of *T. rhodesiense* with the trypanosome (*T. brucei*) of the same appearance so widely distributed in game and domestic stock throughout tropical Africa. In an introduction he briefly summarises the evidence which he considers supports the view that the two are different trypanosomes [see this *Bulletin*, Vol 3, p 415 and Vol 4, p 66]

The military operations in German East Africa have in Taute's opinion furnished additional support to this theory. Notwithstanding the fact that the thousands of troops and camp followers under von Lettow were about in *morsitans* regions where all transport animals rapidly became infected with nagana, the first cases of human trypanosomiasis were noted only in February 1917. The localities in German East Africa and in Portuguese East Africa where cases of human infection were observed are indicated on a map.

A record is given of a series of remarkable experiments wherein *T. brucei* from naturally infected animals was injected into a large number of human beings. The human subjects employed in the first experiment were Dr Taute and 10 natives (criminals) and in later experiments, after the first had proved negative, both Taute and Huber and a whole series of natives, 129 in all. The natives belonged to 11 different tribes and some of them came from districts where *T. rhodesiense* is endemic. Not only healthy men but also weaklings were used in the experiments. The places chosen for the various experiments did not exhibit any climatic differences from those in which sleeping sickness was endemic. The sources of the virus used in the experiments were four naturally infected horses and two naturally infected mules, laboratory strains were not employed. The strains in question were polymorphic and posterior nuclear forms were seen in the blood of three of the horses in question. As control animals, rats, dogs and a goat, were used, and in these the posterior nuclear forms made their appearance.

The following are the details of the first experiment —

Place of experiment Mwitani camp, German East Africa, about four hundred metres above the sea in the Rovuma district.

Date of experiment end of October and beginning of November 1917.

Origin of the *T. brucei* strain. Naturally infected mule K which had had nagana for a year, it had been treated by 4 atoxyl and 5 tartar emetic injections, the last injection being three months previously. The animal, which had made good recovery from its original infection had recently become ill again. In the blood a dimorphic trypanosome of the type *T. brucei* was regularly found, the trypanosome proved pathogenic for rats and dogs.

Individuals experimented upon No 1 Dr T and Nos 2-10 native criminals from the Ssawawara district of the Upper Rovuma. Five of the

individuals were in good condition, the remainder were in poor state of health owing to chronic malaria, ankylostomiasis and chronic dysentery. Frequent blood examinations were made but trypanosomes were never found.

31 x 17 The blood of mule K contained numerous trypanosomes of the dimorphic type, that of the human beings was free from trypanosomes as hitherto.

Individuals Nos 1-10 were each injected under the skin of the chest with 5 cc of blood from mule K immediately after withdrawal. At the same time three rats were each injected with 5 cc of the mule's blood.

2 x 17 Mule K was given Atoxyl gm 2 subcutaneously.

3 x 17 Mule K was given Tartar emetic gm 1 intravenously.

4 x 17 Trypanosomes in considerable numbers were found in the blood of the mule showing that the strain had developed a considerable degree of resistance to arsenic and antimony.

10 x 17 Of the three rats inoculated from mule K two were still alive and showed an infection with trypanosomes of the dimorphic type. Posterior nuclear forms were not discovered.

1 x 1 to 14 x 1 Individuals Nos 1-10 proved completely negative notwithstanding frequent blood examinations and exhibited no clinical signs of disease. Observation of individuals Nos 2-10 could not be continued beyond November 14 for reasons beyond the authors' control, individuals No 1 proved to be free from trypanosomes up to January 1919.

The other five experiments were conducted on similar lines and gave similar results. The 2 Europeans and 129 natives subjected to the experiment remained free from infection.

These observations are held by Taute and Huber to prove that the contention of KLEINE and his school in the important *T. brucei-rhodesiense* question, viz, that the two are not identical, is correct.

W Yorke

NEW HAM Trypanosomiasis in the East African Campaign—*Jl Roy*
Med Corps 1919 Oct Vol 33 No 4 pp 299-311
 With 1 map

Although active operations in the East African campaign had been in progress since 1914, it was not until March 1918, that any instance of human trypanosomiasis was recorded. It should be noted, however, that it was not until the troops reached the vicinity of the Rovuma valley in the latter part of 1917, that they were in an area definitely known to be infected.

During the military operations in Portuguese East Africa it became necessary to open up certain lines of communication. One of these is a line running from Port Amelia through Anquabe, Medo, Balama to Lucnje. It was from this line that the first case of trypanosomiasis among troops was found, in fact at least 4 out of the 5 cases among Europeans contracted the disease between the coast and Anquabe, a distance of 45 miles up the line. *G. morsitans* and *G. pallidipes* were the tsetse encountered. Another line of communication was from Lumbo on the coast through Nampula towards Lake Nyasa. No fly was found between Lumbo and Nampula but beyond Nampula the fly belts are very extensive and reach Lake Nyasa, the species met with were *G. morsitans*, *G. pallidipes* and *G. fusca* in order of frequency.

The line Lindi to Tundura in the southern portion of German East Africa was examined for tsetse and the following species found—*G. morsitans*, *G. pallidipes*, *G. fusca* and *G. brevipalpis*.

Eighteen cases (5 European and 13 native) of the disease passed through the author's hands. The author concludes that the incubation period is between 5 to 14 days. The pathogenic agent was *T. rhodesiense*. A summary is given of the symptoms exhibited.

Regarding treatment the author found that atoxyl was quite inadequate to control the disease. Chief reliance was placed on injections of tartar emetic. Combined treatment (atoxyl and antimony) gave no better results than antimony alone. Intravenous injections of tartar emetic were given twice weekly, starting with a dose of 1 grain and working up to $2\frac{1}{2}$ or 3 grains. The measure of success depended on the ability of the patient to stand the largest doses. Ten of the cases (including 3 Europeans) are recorded as dead or dying, although it is remarked that some of them died from intercurrent disease such as pneumonia and influenza.

Attention is drawn to the fact that in practically all the native cases relapses of simple tertian malaria occurred from time to time, and that two of the natives had an attack of tick fever—in one the attack was fatal—whilst under the antimony treatment, showing how ineffectual tartar emetic is against *Plasmodium vivax*, and *Sp. duttoni*.

W Y

KLEINE (F. K.) Die Schlafkrankheit in Kamerun [Sleeping Sickness in the Cameroons]—*Arch f. Schiffs- u. Trop-Hyg.* 1919 July Vol 23 No 15 pp 315-330 With 1 fig

Towards the end of 1913, the author and FISCHER were ordered to proceed from German East Africa to the Cameroons in order to report on the state of trypanosomiasis in the latter colony. Travelling via the Cape they reached Duala in April 1914. From Duala they went to Bidjoka by rail and thence through the forest to the Njong river, no tsetse were met with on this part of the journey. From Olama they travelled up the Njong in a canoe for a distance of about 400 km to Abong-Mbang and thence trekked to Carnot. A detailed account of this journey is given, especially as regards the distribution of tsetse and of sleeping sickness. On reaching Carnot news of the outbreak of War was received and the return journey to the Coast was made with the utmost speed.

As a result of his observations the author concludes that the behaviour of *Glossina* in the Cameroons, and the local conditions, in so far as these relate to sleeping sickness, differ in no essential respect from those obtaining in German East Africa. The special features in the Cameroons were the extraordinarily wide distribution of the tsetse, the extent of the centres of infection and especially the degree to which it is possible that the disease can escape notice in out of the way districts.

The opinion is frequently expressed that sleeping sickness in the Cameroons has passed its maximum and is diminishing, that formerly there was a very heavy mortality but this is now a thing of the past. To declarations of this kind no weight should be attached. KOCH was, in 1906, informed on good authority of two different districts in East Africa where a great number of natives were alleged to be dying of the infection, on close investigation no trace of the disease was

discovered On the other hand the existence of the infection often escapes the observation of the laity and even of medical men under the peculiar African conditions Kleine recalls two instances where many hundreds in the one case and over a thousand in the other case of infected persons lived for a long time quite close to a station without the officials discovering the fact Certainly there is not the slightest doubt that infections die out of themselves When the disease has swept away the population the infection dies down, but only to break out again and continue its calamitous course when opportunity occurs Civilised people do not wait until a disease has run its course In combating cholera, plague, typhus, tuberculosis, yellow fever, malaria, etc., we did not get far by such a procedure Sleeping sickness cannot be regarded as an exception, we know well how in the case of its most closely allied disease "nagana" the infection does not cease of itself but that animal after animal dies when bitten by infected *Glossina* The chances that sleeping sickness and nagana can die out spontaneously are, in comparison with other diseases, quite small because susceptible individuals (i.e., men and in the case of nagana cattle, horses and dogs) acquire no immunity worth mentioning

The assertion that sleeping sickness has existed in the absence of an epidemic, in the form of local foci, for many years in the Colony is doubtless correct, but this does not imply that prophylactic measures are unnecessary So long as intertribal warfare and unrest prevailed traffic was slight and the infection lacked opportunity to spread, but with the commencement of ordered government trade increases and carriers of sleeping sickness travel into uninfected districts The author enumerates various prophylactic measures which he considers desirable The control and prevention of traffic, prevention of labour recruiting and medical treatment of the sick are the chief Details are given concerning the strength of the medical personnel which Kleine considers necessary for sleeping sickness work in various parts of the colony

W Y

KLEINE (F K) Ueber die Ergebnisse der deutschen Schlafkrankheitsforschung [The Results of German Sleeping Sickness Investigation]—*Deut Med Woch* 1919 July 3 Vol 45 No 27 pp 729-732

In this paper a summary is given of the work done by Kleine and his colleagues in their investigation on sleeping sickness since the year 1907, it contains nothing new At the end of the article the hope is expressed that German investigators will be permitted to work in German colonies in the interest of the natives and of science

W Y

PHIPPS (F E) Les Trypanosomiases dans la région de Carnot (Haute-Sangha) 1. Trypanosomiase humaine 2. Trypanosomiases animales—*Bull Soc Path Exot* 1919 July Vol 12 No 7 pp 416-434 With 1 map

Human Trypanosomiasis During the period July 1917 to November 1918 the author re-examined the Upper Sangha district for trypanosomiasis, he contrasts his findings with those of HICKENBORN,

KEPANDEL, OUZILLEAU, AUBERT and MONTFORT up to 1911, before the province was ceded to the Germans. These observers had found that trypanosomiasis raged especially in the Bania-Carnot zone and even in Carnot and the surrounding districts. At the present time it is still almost exclusively in these places that the disease is found. The further one departs—either to the north, the north-west or the east—from these localities the rarer becomes the disease. Even in the zones which were formerly ravaged by the disease cases now occur only sporadically. The author emphasises the importance of not relaxing the prophylactic measures which have had such beneficial results and points out what he considers to be defects in the present system.

Animal Trypanosomiasis. The Haoussas of Carnot keep a small herd of cattle for food, it is maintained at strength by regular arrivals from N'Gaoundere in the Cameroons. In the dry season the herd does well at Carnot but in the wet season it is decimated by trypanosomiasis. Of 21 beasts examined in June 1918, 16 were found to be infected with *T. cazabour*. The author considers the question of the manner in which the trypanosome is spread among the cattle. He states that the route taken from N'Gaoundere is free from tsetse and that the cattle arrive at Carnot in good condition and free from trypanosomes. It appears that the animals get infected at Carnot or in the immediate vicinity of this place. Glossina were never found in the neighbourhood of the pasturage, but innumerable Stomoxys were encountered which were constantly attacking the animals.

If Glossina are really the only flies capable of maintaining souma in a given district it is necessary, in order to explain the infection among the cattle at Carnot, to accept one of the following alternatives—

(1) That Glossina do exist at Carnot in such extremely small numbers that they have escaped the author's notice—a hypothesis regarded by the author as improbable.

(2) That between Baboua and Carnot the herd traverse a tsetse belt the existence of which has escaped the author.

(3) That the game in the immediate vicinity of Carnot constitutes a reservoir of the virus from which the Stomoxys derive the infection and infect the cattle.

W Y

EMMERICH (Emil) & HALLENBERGER (Otto) Sind Trypanosomiasis und Syphilis verwandte Krankheiten? [Are Trypanosomiasis and Syphilis Allied Diseases?—*Arch. f. Schiffs u. Trop.-Hyg.* 1919 Jan Vol 23 No 1 pp 1-17 With 1 plate]

The paper commences with a brief review of the literature bearing on the subject. The authors have made a comparative study of the clinical and pathological signs produced in experimental animals, rabbits and guinea-pigs, infected with dourine, nagana, and syphilis. They observed a striking similarity both in the clinical and anatomical pictures in the case of the trypanosomal and syphilitic infections. In each instance the disease manifested itself as a subacute, or chronic, septicaemia involving particularly the skin and testes. In the internal organs the changes were insignificant but became more definite in the more chronic cases.

In place of the general oedema of the trypanosome infected guinea-pigs there were observed in the rabbits, infected either with trypanosomes

or syphilis, local cutaneous swellings, which histologically could be differentiated by the fact that in the rabbits suffering from trypanosomiasis the cell infiltration, consisting of lymphocytes and plasma cells, was diffuser and less sharply circumscribed than in those suffering from syphilis. The testes in both infections shewed lymphocytes and plasma cell infiltration with secondary parenchymatous degeneration and a tendency to caseation. This diffuse orchitis is met with in syphilis only after long duration of the disease and in animals subinoculated from infected animals, the primary testicular infections with human virus is characterised by the formation of small clearly defined tumour-like syphilomas which are not observed in trypanosomiasis. The testicular integuments and the epididymus shewed chronic inflammation. These testicular lesions in experimental trypanosomiasis and syphilis have, in the authors' opinion, on account of the similarity and regularity of their appearances, far more value for demonstrating the relationship of the two infections than the changes in the central nervous system, which occur only in a small proportion of cases and were not observed by the authors.

From a study of the clinical and anatomical pictures in experimental animals only it must be concluded that trypanosomiasis and syphilis are very closely allied. To obtain a definite answer to the question however, it is still more important to compare the clinical and anatomical pictures in naturally infected men and animals. Consideration of naturally acquired infections reveals a whole series of similarities but it must be noted that the deviations are at least equally numerous and perhaps even more striking. Nagani has little in common with syphilis, and even human trypanosomiasis although doubtless it resembles syphilis in certain respects differs from it in others. Human trypanosomiasis ends regularly in sleeping sickness and progressive paralysis but tabes dorsalis occurs in only a small proportion of syphilitics. Even though the clinical picture of sleeping sickness and general paralysis may resemble one another closely one must not forget that the very similar pathological appearances have in the two cases quite a different genesis, in general paralysis there is a primary parenchymatous degeneration but in sleeping sickness the parenchymatous degeneration is secondary to the inflammatory changes in the vessels. Still more striking are the differences when the nervous system changes are compared in diseases so very similar as syphilis and dourine. In dourine the involvement of the nervous system commences as a polyneuritis affecting chiefly the sciatic, tibialis, and peroneus nerves and spreading in certain conditions to the lumbar portion of the cord where extra-dural inflammatory softenings and degeneration foci are formed, which according to MAREK exhibit no analogy with the processes occurring in tabes dorsalis of man. Finally in naturally acquired nagani the lesions in the nervous system are, so far as knowledge goes, limited to an increase in cerebrospinal fluid with hydrocephalus internus and externus.

In conclusion the authors believe that the relationship between syphilis and trypanosomiasis is still an open question, to deduce a relationship of the causes of two diseases merely from a number of similarities in clinical and pathological signs is in their opinion not permissible.

W. Y.

BRUMPT (E) *Maladie de C Chagas, au Brésil Mode de transmission, origine, conditions qui déterminent sa répartition actuelle*—*Bull Acad Méd* 1919 Mar 4 Vol 81 3 Ser Year 83 No 9 pp 251-253

According to CHAGAS the disease which bears his name is spread by the bites of infective insects. Although this mode of transmission has been demonstrated, at least in the case of *Triatoma megista*, by CHAGAS and his pupils, in the experience of Brumpt and other observers the infection is transmitted habitually, so far as man is concerned by the defections of the *Triatoma*, and in the case of animals, such as rats and mice, by the ingestion of the insects.

The Triatomas, which are especially American insects, are found between 41° north (*T. protracta*, at Great Lake City, Utah) and 41° south (*T. infestans*, at Bahia-Blanca, in the Argentine). About 10 species are known, their mode of life is interesting because whilst in nature they are mainly dependent on wild animals certain species at least have become progressively adapted to human habitations. The first *Triatoma* found infected was *T. megista*, then later, *T. gemculata*, *T. infestans*, *T. sordida*, *T. vitticeps* and *T. dimidiata* var *maculipennis*. The author has been able experimentally to infect the following with *Trypanosoma cruzi*—*T. sanguisuga* (of Texas), *Rhodnius prolixus* of Venezuela, *Cimex lectularius*, *C. rotundatus*, *C. boneti*, *C. harundinis*, *Ornithodoros moubata*, and *Rhipicephalus sanguineus*.

In view of the ubiquity of the trypanosome and the vast geographical distribution of the vectors, natural and experimental, the question arises why the spread of Chagas' disease is relatively so slight. It is probably due to various factors of which the chief are (1) the relationship of the *Triatoma* with man, (2) the capacity, greater or less, of a given species to conserve and inoculate the virus, and (3) the effect of divers geographical factors on the evolution and survival of the trypanosome in the intermediary hosts.

The *Triatoma*, which is unknown in the grass huts of the Indians, have become domesticated since the European occupation and the construction of houses of wood and mud, in which the insects find shelter from light, heat and cold, and abundant food on men and animals. This type of human habitation then encourages the domestication of the *Triatoma* which emigrate from the surrounding districts. Owing to certain biological peculiarities, all species of *Triatoma* are not equally adapted to transmit the disease. Brumpt finds a further important factor to be cold—the trypanosome does not develop in bugs kept at 0° C.

W Y

TORRES (Magarinos) & VILLACA (Joao) *Encephalite e myelite causadas por um trypanosoma ("T. cruzi")*—*Brazil Medico* 1918 Dec 21 Vol 32 No 51. pp 401-402

The authors inoculated small dogs with *T. cruzi* and on histological examination of their central nervous systems found lesions presenting marked constancy of appearance and pointing to a condition of encephalitis and myelitis. The animals died or were killed from the 18th to the 25th day after inoculation in an acute phase of infection by *T. cruzi*. Two forms of lesions were found, the one presenting

clearly defined foci, the other less intense and more diffuse in character. The focal lesions affected the brain and spinal cord and were never found in the cerebellum. They were present both in the white and the grey matter but were much more numerous in the former. The localization of *T. cruzi* itself in the central nervous system of the dogs experimented on was of two types. In the one the trypanosome was found in the interior of a cellular element in the nervous substance itself and away from any encephalitic or myelitic focus and from the blood vessels. In this case the cellular element was so much distended as to be visible under a low power. Here the morphology of the parasite was always that of a flagellate organism and they were so numerous and so much intertwined that it was difficult to obtain clear definition of any single individual. In the other disposition the cellular element invaded was found in the encephalitic or myelitic focus itself or in its immediate neighbourhood and contained, as a rule, few (5-20) parasites. Here the morphology was always that of a leishmaniform body. In none of the dogs was there any evidence, macroscopic or microscopic, of meningitis. A detailed account illustrated by drawings and micro-photographs will be published in the *Memorias do Instituto Oswaldo Cruz*.

F. S. Arnold

DANILLS (C. W.) & NEWHAM (H. B.) A Case of *Trypanosoma rhodesiense* Infection which Recovered—*Lancet* 1919 Nov. 7 pp 829-830

The patient was a young man of twenty years. He went to Nyasaland in September 1913, between that date and December 1914, he was frequently bitten by tsetse in various parts of North Eastern Rhodesia. In December 1914, he moved to the frontier of German East Africa where he remained until April 1915. During this period he was constantly in fly-infested areas. In September 1915, shortly after returning to Fort Jameson, he began to get attacks of what he thought was malaria. Malaria parasites were found but as quinine did not stop his fever a gland in his neck was punctured and trypanosomes were found.

Whilst in hospital in Rhodesia he had atoxyl, gr $3\frac{1}{2}$, every third day. This continued until he landed in England in November 1915, and came under the care of Dr. Daniels. Treatment at first consisted of atoxyl gr $3\frac{1}{2}$ thrice weekly intramuscularly, with antiluëtin gr $\frac{1}{2}$ in solution once daily by the mouth. On December 8, 1915, injections of antimony oxide (Martindale) subcutaneously were begun, starting at first with a dose of 30 minims per diem and increasing this gradually until as much as 130 minims were given in 24 hours. The atoxyl and antiluëtin were continued although owing to severe nausea it was found necessary to stop the latter drug from time to time. In March 1916 the characteristic circinate rash was first noticed, it lasted about a week, then gradually subsided. As trypanosomes still appeared in the blood from time to time it was decided to stop administration of antimony oxide and to try the effects of repeated intravenous injections of tartar emetic in doses of grs $2\frac{1}{2}$ twice a week. The administration of atoxyl was also discontinued but the antiluëtin was continued. Tartar emetic injections were continued until April.

1918 Trypanosomes were seen for the last time on April 6th 1916 Since cessation of treatment the patient has remained in good health The authors write —

‘The case is chiefly remarkable from being the first on record in which one may feel fully confident that a definite cure has resulted in a true case of Rhodesian trypanosomiasis, and for the really enormous amount of tartar emetic it was found possible to administer. In all the patient had considerably over 500 grs. of the drug and no untoward effects of such administration have manifested themselves.’

W Y

LURZ (R) *Heilungsversuche mit Salvarsan bei Schlafkrankheit.*
[Attempts at the Therapy of Sleeping Sickness by Salvarsan]—
Arch f Schiffs- u Trop-Hyg 1919 July Vol 23 No 14
pp 308-313

The author has already recorded the results of his earlier observations in this direction [this *Bulletin*, Vol 4, p 70] The work, which was commenced in 1914, was interfered with by the War Only those patients in a state of good nutrition and without nervous symptoms were observed All those in an advanced stage of the disease or whose spinal fluid contained trypanosomes or more than 10 cells per cc were rejected Patients of over 50 kgm were given doses of 4 gm and those of under 50 kgm 3 gm The drug was given on two consecutive days each fortnight until six doses had been administered The results which are set out in a table were unsatisfactory The majority of the cases lost weight during treatment and trypanosomes did not disappear from the blood

W Y

DANIEL (G) *L'iodo en thérapeutique tropicale spécialement contre la trypanosomiase*—*Presse Med* 1919 Sept 4 No 19 pp 492-493

In this article a summary is given of the result of 20 years' experience in the use of iodine compounds in the treatment of tropical diseases

Iodosalyl appears to be much more effective in the treatment of trypanosomiasis than arsenical preparations and never causes any unpleasant results either general or local The drug is prepared by mixing metallic iodine 2 gm, salol 25 gm, and olive oil 100 gm, and dissolving over a water bath, it should be given intramuscularly in a dose of 5 cc per 80 kilo of body weight The dose can be increased without causing iodism The author recommends that treatment should commence with an intramuscular injection of atoxyl 1 gm, intravenous injection of soamin 50 cgm, and the following day an injection of iodosalyl 5 to 10 cc This should be repeated every week, after three or four months the arsenical treatment can be stopped and the iodosalyl reduced to two injections per month

In 1910, 12 soldiers (natives) suffering from sleeping sickness were treated with success at Lukula Camp (Mayumbe) In 1913, 2 Europeans were successfully treated at Dima (Kwango); in 1914, 53 natives at Tshitadi (Kasaye) with unknown results and in 1916 to 1919, 9 natives were treated and cured at Irumu.

The author states further that in filariasis the effect is rapid but treatment should be continued for a year to prevent relapses. In relapsing fever a hundred per cent of cures result within a month.

The conclusions are —Iodosilyl appears to be a drug to be chosen for treatment of affections of the liver, spleen, haematopoietic organs and lymphatic system. It cures filariasis, relapsing fever and, associated with uenic, it seems very efficacious in the therapy of sleeping sickness.

W Y

VITO (H) **Trypanosomiase des chevaux du Maroc Guérison de la maladie expérimentale du chien par l'osarsan**—*Bull. Soc. Path. Exot.* 1919 May Vol 12 No 5 pp 220-223 With 2 charts

Details are given of four dogs experimentally infected with *T. marocanum*. The drug used was osarsan, it was administered intravenously in doses of 1 gm repeated each 7 to 9 days until 3 or 4 injections had been given. All four animals can be considered as cured, they were in excellent condition and the blood examinations were negative for 9 months after cessation of treatment in the case of the first three animals and for 4 months in the case of the last.

W Y

HOKSF (M D) **The Influence of Anorganic Antimony Compounds on Trypanosomes in the Animal Body**—*Folia Microbiologica* 1918 Nov Vol 5 No 2 pp 126-140 With 1 chart

Rabbits and guinea pigs infected with nagana and dourine were treated by intravenous injections of 1 per cent solution of tartar emetic. Although parasites disappeared from the cutaneous blood very quickly, sometimes within ten minutes, a relapse always occurred and the animal died. Experiments with antimony trioxide were more successful, the drug was suspended in syrupus simplex (pharm. helv.) 100, pulvis gummi arab 7.5, carefully mixed in a mortar and sterilised at 120° C for 15 minutes, as a rule 150 mgm of Sb₂O₃ were added to 1 cc of this mixture. The author claims that he cured 2 of 9 rabbits with a single intravenous injection.

W Y

YAKIMOFF (W L) & OTHERS **Trypanosomiasis of Camels in Russian Turkestan**—*Parasitology* 1918 Nov Vol 11 No 1 pp 35-80 With 3 plates

Trypanosomes were found in 22 (4.38 per cent) of 502 camels examined in Turkestan. By inoculation into guinea pigs four strains—Bokhara virus, Termez virus, Samarkand virus and Ashkhabad virus—were obtained and taken to Petrograd for examination. As a result of a minute examination of the morphology of the strains the authors conclude that they present no differences. The trypanosome is furnished with a free flagellum and its length is approximately 20 to 25 μ . Observations were made on the vitality of the parasite *in vitro*, at 17° C and at 0° C, and a number of experiments were

made to determine the agglutinating action of various sera, from which it appears that human serum has the most effect and then, in descending order, that of the rabbit, horse and bull

The trypanosome infected many species of mammals and also some birds. The course of the disease in mice, rats and dogs is acute, in guinea-pigs, rabbits, pigs and horses sub-acute, and in large cattle and sheep chronic. Of the four kinds of birds—goose, fowl, duck, and pigeon—examined, only the goose proved to be susceptible to infection. The goose in question was inoculated from an infected mouse, its blood was examined daily with negative result until the 37th day when the animal died. It was however proved to be infected, as mice sub-inoculated with its blood on the 7th and 21st days became infected.

An exhaustive examination was made of the blood of infected horses, dogs and mice. The points examined were as follows—the erythrocyte count, the percentage of hæmoglobin, the total leucocyte count, the leucocyte formula, the Arnetz index, and the alkalinity of the blood.

The pathological changes in the animals which succumbed as the result of experimental injection were few. In rats and mice the spleen was greatly enlarged, but this was less striking in the case of rabbits and guinea-pigs. In a foal there was well marked oedema of the subcutaneous connective tissue of the neck, an infiltration of yellow colour under the pleura of the anterior part of the thoracic cavity, in the pericardium, transverse sulcus of the heart muscle and the intermaxillary space, exudation in the thoracic and peritoneal cavities, and emaciation. In the pig the changes were emaciation, enlarged lymphatic glands, exudation into the thoracic and peritoneal cavities and pericardium, and an enlarged compact spleen. The goose exhibited no pathological signs.

Various chemotherapeutic experiments were performed with arsenic and antimonial preparations and also with trypan-blue and dianil-blue, but no very great success attended these efforts.

W Y

LEGUÉ (M) & VIFFENÉ (M) *Epizootie à trypanosomes chez les Rovidés de la Guyane française* *Bull Soc Path Exot* 1919 May Vol 12 No 5 pp 258-266

The authors point out that although several pathogenic trypanosomes viz *T. equinum*, *T. venezuelense*, *T. lappaceum* and *T. equiperdum*, have been recorded from South and Central America they have all been found in Equidae. It is interesting therefore to note that cattle were found infected with trypanosomes in a village in French Guiana, at the beginning of the epidemic about the end of 1917, there were in the village 180 head of cattle, but at the time of writing there remained but 85, and of these 30 were in a pitiful condition.

The chief symptoms exhibited were fever, anaemia, emaciation, oedema and diarrhoea, and in the final stage loss of hair, lachrymation, locomotor troubles, paresis and paralysis of the hind quarters and finally death. Ocular symptoms were not observed.

The number of trypanosomes in the peripheral blood varies greatly, sometimes they are numerous and easily found but on other occasions they cannot be found. The authors state that the infection is very probably transmitted by the numerous tabanids which harass the herds, they record, however, that they have sought in vain for flagellates in the intestines of these insects.

An account of the morphology of the trypanosomes is given, the blepharoplast is always apparent and is rounded or oval and subterminal, the undulating membrane is well developed and there is a free flagellum the length of which is 6 to 7μ . The parasites vary in length from 16 to 26.5μ . A guinea-pig and a dog were inoculated with infected blood without success.

The authors consider this parasite to be a new species and give it the name *Trypanosoma guyanense*.

W. Y.

NOELLER (W.) Beitrag zur Kenntnis des Schaftrypanosomas (Vorläufige Mitteilung) [A Study of the Sheep Trypanosome Preliminary Communication] *Arch f Schiffs u Trop-Hyg* 1919 March, Vol 23 No 5 pp 99-100

The sheep trypanosome has hitherto been found twice only by Woodcock in 1910, and by BEHN in 1911-1912, and culture from sheep's blood has not been successful. It is known that in Germany almost every *Melophagus ovinus* is infected with the flagellate, *Cnithidia melophaga*, which is supposed to be a developmental stage of the sheep trypanosome.

Noller decided to investigate this supposed relationship and with this object in view attempted to cultivate both the trypanosome from the sheep's blood and the cuthidia from the sheep tick. He succeeded in obtaining good cultures of each in blood-bouillon and also on blood agar. On comparison the cultures proved to be similar, the parasites being characterised by a very great development of the undulating membrane which ran far along the flagellum leaving only a short free portion. A further account of this work is to be published shortly.

W. Y.

SERGEANT (Edm & Et) & LHERITIER (A.) Passage de trypanosomes de la mère au fœtus dans le "Debab." *Bull Soc Path Exot* 1919 Apr Vol 12 No 4 pp 177-178

A female camel inoculated with *T. berberum* had fever from the third day, trypanosomes appeared in its blood on the fifth day and on the thirty-sixth day it aborted. The blood of the stillborn offspring proved infective when inoculated into a dog, although parasites were not found on direct microscopic examination.

A second camel inoculated with the same parasite also had a fever from the third day and parasites in its blood from the fifth day. It aborted in the sixty-fourth day and the blood of its stillborn offspring also proved infective when inoculated into a dog.

The conclusion is that *T. berberum* is capable of passing through the placental filter.

W. Y.

BASSETT-SMITH (P W) **The Infection of Their Young by Trypanosome Infected Mothers (Preliminary Report)**—*Jl Trop Med & Hyg* 1919 Nov 1 Vol 22 No 21 p 198 With 1 fig

The author found *Trypanosoma rhodesiense* in the placental blood of a rat the uterus of which contained a number of well developed embryos. Trypanosomes were also found in moderate numbers in liver smears of the embryos. Bassett Smith states that it is therefore certain that *T. rhodesiense* can pass direct from the mother to the foetus. He has at the present time living examples of direct infection of the young from a guinea pig infected with *T. gambiense*, but it is impossible to say whether the young became infected in utero or by the milk. [This should be compared with the paper of SERGENT and LHERITIER above.]

W Y

SERGENT (Edin & Et) & LHERITIER (A) **Dromadaires immunisés contre la Trypanosomase "Debab"**—*Bull Soc Path Exot* 1919 Feb Vol 12 No 2 pp 86-90 With 3 charts

Two instances of immunity to *T. berberum* were observed amongst dromedaries, the first was an acquired immunity following the treatment of an experimentally infected animal, and the second was a natural immunity.

The first animal was inoculated in September 1906, 18 months later it was still infected but not at the end of the third year. Between Nov 1910 and Feb 1913 it was re-inoculated three times with massive doses of *T. berberum*, but did not become infected as was shown by subinoculation of its blood into dogs. In July 1913, the animal was injected with *T. maroccanum* and became infected showing that this virus differs from *T. berberum*, three months later it had recovered. In April 1914, it was re-inoculated with *T. maroccanum* without becoming infected. In Dec 1914, it was inoculated with *T. equiperdum* from a horse which had contracted dourine in North Africa, it became infected but after four months this infection had died out. It follows from this that *T. equiperdum* differs from *T. berberum*. In September 1915, the animal was re-inoculated with *T. equiperdum* and between March 1917 and June 1917 it was further inoculated nineteen times with *T. equiperdum*. From September 1917, to March 1918, it was re-inoculated eleven times with *T. berberum*—on each occasion with all the blood of an infected guinea-pig. In November 1918, the animal was again re-inoculated with *T. berberum* and developed after this a light infection, two dogs which were sub-inoculated from it becoming infected.

The second animal was inoculated with *T. berberum* for the first time in November 1918, it did not become infected although ten other dromedaries inoculated with the same virus about the same time all became infected and developed the disease in a typical fashion. In December 1918, the animal was again inoculated with *T. berberum* and again trypanosomes failed to appear in its blood; however, 22 days later its blood injected in large quantities (160 cc.), into each of two dogs produced infection.

The authors state these final successful sub-inoculations proved that the two dromedaries were infected although they exhibited no sign of disease, and consequently the question arises whether this "relative immunity" was not really the persistence of a feeble infection. The history of the first animal is however against this as between September 1906, and March 1913, large quantities of blood (160 to 300 cc) were injected into dogs on four occasions with negative results. It was possible that the eleven massive injections of virulent blood given between November 1917, and March 1918 had, instead of reinforcing the immunity, broken it down.

W Y

RODHAÏN (J) *Sensibilité du Rongeur africain, Tachyoretetes annectens*
Th., au *Trypanosoma pecaudo*—*Bull Soc Path Exot* 1919
Feb Vol 12 No 2 pp 84-86

There was in 1916 a heavy mortality, due to *T. pecaudo* amongst the mules and asses belonging to the Belgian troops stationed at Kibati to the north of Lake Kivu. These animals had come from the Egyptian Sudan, via Uganda. The trypanosome in question was pathogenic for the grey rats of the country, for dogs and for a burrowing rodent, *Tachyoretetes annectens*, which abounds in the mountainous prunes in the vicinity of the Lake.

Rodhaïn considers the trypanosome to be related to *T. pecaudo* rather than to *T. brucei* as the latter strain, which he has examined in the regions bounding Uganda, has always exhibited in my short posterior nuclei forms, whilst in the Kibati parasite these forms were exceedingly rare. The author concludes by remarking that he had neither the time nor the means to establish his diagnosis.

W Y

UNNA (P G) & TIRLEMANN (Eleonore Thea) *Zur Chemie des Trypanosoma gambiense* [On the Chemistry of *T. gambiense*]—*Arch f Schiff's u Trop-Hyg* 1919 Jan Vol 23 No 2 pp 37-17 With 1 coloured plate

Reference is made to the earlier work of the authors on the chemistry of Amoebs [this *Bulletin*, Vol 11, p 52] in which it was shown that the body which stained red with Giemsa is nuclear protamine, a basic albumen. The red in the azure eosin mixture has an affinity for the nuclei of many protozoa, especially those of the malaria parasite and trypanosomes, and the red colouration resulting from the Giemsa stain has therefore become an essential character for protozoa nuclei.

In the present work the authors examine the question whether the substance which stains red with Giemsa in the nucleus of the malaria parasite and other protozoa consists also of protamine, or if not of this, of the closely related Kossel's histone. For the investigation *T. gambiense* was chosen. A detailed account of the experimental technique and of the results obtained is given, it is of a somewhat technical nature and must be consulted in the original by those interested.

The general conclusion reached from this micro-chemical investigation appears to be that in the trypanosome nucleus Kossel's histone is the chief albumen content.

W. Y.

PONSELLE (A) **Sur la culture des trypanosomes**—*C R Soc Biol*
1919 Feb 22 Vol 82 No 4 pp 153-161

In continuation of his work on the factors determining the suitability of a medium for the cultivation of *T. rotatorium* (this *Bulletin*, Vol 11, p 164) the author finds that it is the concentration of the hydrogen ions which is essential. Expressed in terms of the formula $P \pm$ (Sorensen) the concentration should be 5.6. Solutions having this concentration of hydrogen ions and of the composition given in the previous paper when mixed in the proportions of 10 vols. to 1 vol. of infected blood give good cultures at a temperature of 20° C. in 18 hours. The $P \pm$ after the addition of the blood is about 6.2. W. Y.

DORÉ (A, B) **Rat Trypanosomes in New Zealand**—*N Z Jl Sci & Techn* 1918 July Vol 1 No 4 pp 200 [Summarised in *Rev Appl Entom B* Vol 7 p 47]

T. lewisi was found in rats in various parts of the North island, of those caught in the neighbourhood of sewers 30 per cent. were found infected as against 12 per cent. of those captured on wharves and in grain stores. The author believes that the trypanosome may be the primary cause of the fact that the native rats, introduced by the Maoris, are rapidly disappearing as these animals may not possess the immunity which the European species exhibit. W. Y.

LEBAILLY (Charles) & CAILLON (Louis) **Le Trypanosome de *Bufo mauritanicus***—*Arch Inst Pasteur de Tunis* 1919 June Vol 11 No 1 pp 28-30 With 1 plate

A trypanosome was found in the blood of *Bufo mauritanicus* in Tunis which appeared to be akin to *T. bocagai* found by FRANÇA in *Bufo regularis* in Portuguese Guinea. The parasites were extremely scanty and were found by direct examination in only one of thirty toads. On two other occasions they were obtained by culture on N N N medium from blood which was negative on direct examination.

The trypanosomes are effilated at each extremity and are furnished with a long flagellum. The undulating membrane is well developed. The nucleus is spherical and is situated posteriorly in the neighbourhood of the blepharoplast which is oval and of large size. The flagellum arises from a little granule close to the blepharoplast. The juxtaposition of the nucleus and blepharoplast, especially in culture, renders the differentiation of the two structures difficult, [in most of the forms figured from the blood the nucleus is posterior to the blepharoplast, whereas in the three forms figured from cultures the reverse is the case, the nucleus is always close to the blepharoplast]. The total length of the trypanosome is about 44 μ . W. Y.

DUKE (H. Lyndhurst) **Some Observations on the Bionomics of *Glossina palpalis* on the Islands of Victoria Nyanza**.—*Bull Entom Res* 1919 Mar Vol 9 No 3 pp 263-270

In July 1918 the author re-visited certain of the Sesse Islands—Damba, Tavu, Kimmī, Nsazi and Bulago—and found that the fly, *Glossina palpalis*, had decreased very markedly in numbers. On (611)

seeking the cause for the diminution one outstanding fact was at once apparent. During the recent rise in level, which attained its maximum in June 1917, the lake invaded and in many cases completely covered the great majority of the sandy beaches especially favoured by the fly for the deposition of larvae. Reference is made to the statement of FISKE that 90 per cent of the flies on the islands are from pupae deposited on the beaches of sand or gravel.

Without dogmatism on the cause and effect of the present marked diminution of *G. palpalis* on the islands visited Duke holds, after due consideration of the fact, that it is justifiable, as a working hypothesis, to assume that the invasion of the favourite sand breeding grounds by the lake has exerted a powerful adverse effect on the fly of the northern shores and islands of Victoria Nyanza. As the lake falls the fly, on this hypothesis, will again increase in numbers. At the time of writing the level is already 18 inches lower than in June 1917 and the fall will probably continue steadily.

Duke recommends that an endeavour be made immediately to accentuate the work of the lake by systematically clearing away the sheltering *Acalypha* and *Tournefortia* shrubs from certain known breeding areas, thus still further reducing the suitable breeding accommodation. This procedure should be applied to certain carefully selected islands, e.g., Nsazi, Lwagi and Bulago, which would be suitable for cattle. There are probably other islands of the great and fertile Sesse and Buvuma groups which could, with relatively little expense and labour, be opened once again, but the control of these distant islands would be a very much more difficult proposition.

The advisability is considered of constructing a permanent dam at the only known outlet of Lake Victoria, viz., the Ripon Falls, Jinja, which are about 300 yards wide and divided into three parts by two islets, a rise of three feet above the level of June 1918, would ensure the submergence of the greater part of the present breeding area of the fly. Duke believes that the fly would be reduced to such an extent by this procedure that even if the rise in level were maintained for only six months the remnant could be dealt with by limited measures such as trapping, attention to possible remaining breeding ground etc.

W. A.

SCHWEITZ (J.) L'identité des conditions géo-botaniques des gîtes à pupes de la *G. palpalis*, de la *G. fuscica*, de la *G. brevipalpis*, de la *G. pallidipes* et de la *G. morsitans*. (Note préliminaire.) Bull. Soc. Path. Exot. 1919. May. Vol. 12. No. 5. pp. 231-238.

While some information has been accumulated regarding the pupae of *G. palpalis* and *G. morsitans* but little is known of those of *G. brevipalpis*, *G. pallidipes* and *G. fuscica*. During the three years 1916-1918, Schweitz has devoted much time to a comparative study of these tsetse and has collected numerous pupae of each of the five species. His observations were made in the northern Katanga between the river Lualaba-Congo and its great tributary the Lomami, in a locality where all five species were found in great numbers.

The pupae of *G. palpalis* were found most easily and those of *G. fuscica* with greatest difficulty. Frequently pupae of two or even three species were found in the same site. The conditions absolutely

essential for a pupal habitat are in the case of all Glossinae —(1) Tight dry soil and (2) Shade. There are however, certain secondary conditions and these explain why in addition to the real pupal habitats — places where pupae are found in great numbers, one often finds isolated pupae scattered about notwithstanding the fact that the locality satisfies the two essential requirements.

G. palpalis inhabits the wooded haunts of water courses, the place of choice for depositing its pupae are sandy regions, but where pure sand fails the fly contents itself with sand mixed with earth, or even earth alone, if it is light. As these places are very often inundated in the rainy season, *G. palpalis* deposits its larvae here only in the dry season. At the commencement of the dry season one finds living pupae almost exclusively but at the end of the dry season only pupal cases. When the banks of rivers are inhabited by *G. brevipalpis* or by *G. fusca* the pupae are found in localities similar to those in which *palpalis* pupae are found. *G. morsitans* and *G. pallidipes* inhabit as a rule moderately wooded, or park-like country of enormous extent and often without any water. *G. brevipalpis* adapts itself equally to the habits of *G. morsitans* and those of *G. palpalis*.

Where are the pupae of all these species to be found? Even in the case of *G. palpalis* the question is not simple because the banks of streams are sometimes swampy even in the dry season, and because even though the tsetse deposits its pupae by preference during the dry season the process still continues during the rains. One can always find pupae, either isolated or in numbers, in suitable localities. But even in quite suitable localities where the earth is dry and light and the shade sufficient there exist favourite spots where pupae are most likely to be found, there are the large trunks of felled or uprooted trees lying horizontally or a little obliquely, touching the ground or what is still better raised some centimetres above it. Whether these tree trunks are dead or living, with bark or without, it matters little, the under surface providing all necessary conditions, as neither the sun nor rain penetrate the ground is neither baked nor wet. In one such locality Schwetz collected about 200 pupae of *G. fusca*. The trunks of fallen trees have still a further advantage, the tsetse find them to give good support at once perpendicular and close to the ground at the moment of expulsion of the larva. Referring to the character of the undergrowth the author states that this, whether arborescent or herbaceous, should not be too thick because this would prevent the insect from flying about and choosing a good place to deposit its larva, and furthermore the numerous little roots make the ground too firm. The complete absence of undergrowth is however equally unfavourable because even though the shade afforded by the high trees is sufficient the tsetse have not the necessary support at the time of parturition. An undergrowth which is not too thick is the ideal.

Although fallen trees constitute places of predilection for pupae they possess no monopoly. Numerous pupae of all five species of Glossina were found in widely different sites — in cavities in dead or living trees containing a little sand or earth, under the lower branches of trees and especially at palms. A dozen pupae of *G. palpalis* were found at the base of a palm in the forest belt about 50 metres from a little marshy stream.

W. Y.

PELLAGRA

Report of a Committee of Enquiry regarding the Prevalence of Pellagra Among Turkish Prisoners of War—pp 65 With illustrations 1919 Alexandria Army Printing and Stationery Department

The Committee assembled at Kantara in October 1917 The work was divided into three stages and these again into separate sections which furnished reports on special subjects from time to time

Stage 1 dealt with conditions in the labour camps at Kantara The result was that true pellagra was found to exist in prisoners just captured and that the hygiene of the camps was so good that further research on these lines was profitless

Stage 2 was concerned with the clinical and laboratory study of large numbers of pellagrins in the surrounding districts This material as regards length of infection ranged from newly captured pellagrins to old asylum cases All stages of the disease were thus studied The work was divided into sections and separate reports were made The clinical section reported that the disease was true pellagra and generally had been contracted before capture It was found also that German Prisoners of War were not affected with the disease Two other important clinical facts were elicited, (1) That there was a defective secretion of hydrochloric acid which led to disturbances of pinceritic function with consequent digestive troubles and mal assimilation of proteins and fats, (2) That in pellagrins there was a marked fall in blood pressure and that "the clinical features of the disease are those of a profound supra-renal inadequacy"

The Pathological reports can be presented together Autopsies in 60 pellagrins were performed with the result that in only two did death seem to be due to the disease itself Pneumonia was the chief contributory cause No protozoal or bacterial aetiological factors were discovered The anaemia present was of a chlorotic type The diarrhoea was accentuated by the presence of intestinal worms and flagellates

The Biochemical section found that there was a triple loss of protein " (1) Some is not brought into assimilable form, (2) some is destroyed by bacterial putrefaction, (3) some is removed by diarrhoea before absorption can occur " The conclusions of the statistical section show that pellagra did not occur among the non-Ottoman prisoners of war, that there was a definite increase in the number of pellagrins among the labouring prisoners but only to a very slight extent in the non-labour camps, that the increase was not due to infection nor to biting insects

Naturally the most interesting section of the report is that dealing with dietetics The correct diet for a normal Turk was worked out with due allowance for those who had to perform manual labour It was found that "the food issued to all prisoners of war was adequate for the needs of normal men, due regard being paid to the energy output required from labourers," also no connection could be traced between the prisoners' diet after capture and the incidence of pellagra. However for long periods prior to capture the Turkish prisoners had

been living on a diet below minimal needs. Another interesting observation was that many of the prisoners were really incipient pellagrins who remained healthy while at rest but under labour conditions developed the disease owing to inability to assimilate the sufficient food given them.

Stage in of the report deals with further biochemical and dietetic observations along the lines already presented. As regards treatment it is reported that "Pellagra manifestations can be arrested, in their early stages, by an increase in biological value of protein in the diet."

[The obvious importance of this report demands a full abstract. In many respects the work was done under ideal conditions since the material was under absolute control for a long period and every aid could be obtained from army sources. It is to be regretted that the original workers on this epidemic were not consulted. Much valuable assistance was, in this way, lost. One fact must be mentioned, viz, that there was a severe outbreak of pellagra among German prisoners after the Committee had handed in its report. Again the high percentage of death from pneumonia must be discounted owing to the fact that influenza was raging at the time. Further reports on the above outbreak are in course of preparation and doubtless these will throw further light on this extremely interesting outbreak of pellagra.]

A Douglas Bigland

GOLDBERGER (Joseph), WHEELER (G. A.) & SYDENSTRICKER (Edgar)
A Study of the Diet of Non-Pellagrous and of Pellagrous Households in Textile Mill Communities in South Carolina in 1916.
Jl Amer Med Assoc 1918 Sept 21 Vol 71 No 12
 pp 944-949 With 2 charts

The authors find that the diet fault in pellagra is the result of one or more of the following factors — "1. A physiologically defective protein supply, 2. A low or inadequate supply of fat-soluble vitamins, 3. A low or inadequate supply of water-soluble vitamins, 4. A defective mineral supply."

It was found also that the diet of the pellagrous households was deficient in energy and protein. This apparently was not an essential factor but may have been contributory by allowing a deficiency of one or more of the essential dietary factors. The diet fault may be corrected and the disease prevented by giving adequate amounts of animal protein, particularly milk, including butter, and lean meat.

A. D. B.

GOLDBERGER (Joseph) **Pellagra, Its Nature and Prevention.** —
Public Health Rep 1918 Apr 5 Vol 33 No 14 pp 481-488

In this paper the author does not pretend to break any new ground. It consists merely of answers to various questions which the general public asks concerning pellagra.

Symptoms and general factors of incidence are described. The cause of the disease is an unbalanced diet while its prevention can be brought about by a balanced diet. Pellagra is definitely stated to be not "catching." The usual methods of treatment are discussed.

A. D. B.

SILER (J F), GARRISON (P E) & MACNEAL (W J) **The Relation of Pellagra to Location of Domicile in Inman Mills, Inman S C —**
Arch Intern Med 1917 Oct 15 Vol 20 No 4 pp 521-559 With 12 figs

The authors summarise their work as follows —

“1 Inman Mills is a cotton mill village of about 650 persons, situated in the country, relatively segregated from the main lines of travel in Spartanburg County. In several respects it presents a contrast to Spartan Mills, approaching more nearly the rural type of community in respect to water supply, sewage disposal, gardening, domestic animals and food supply.

“2 This village remained relatively free from Pellagra until after the great extension of the disease in Spartanburg County in 1911. In the following year there was a marked increase in the incidence of Pellagra at Inman Mills in several very definite small foci, and since 1912 it has remained an active endemic centre of the disease.

“3 Men between 15 and 44 years of age have very largely escaped the disease here just as they have elsewhere in Spartanburg County.

“4 In each of the three years of extensive epidemiologic study the new cases of Pellagra were found to have risen almost exclusively in persons living in the same house with antecedent Pellagrins or next door to such houses.

“5 In this community the spread of Pellagra has evidently proceeded from the sick person to his healthy neighbours, either directly or indirectly through very limited distances.

“6 Only a small percentage of the neighbours have been attacked in any year, and it is evident that susceptibility has been an important factor in this respect.

“7 The relation of the spread of Pellagra to the location of domicile at Inman Mills has been essentially the same as at Spartan Mills. These studies support the conclusions of our Second Progress Report in regard to the spread of Pellagra.”

[The authors evidently regard the spread of pellagra as due to some infection. Their results however do not exclude the possibility that some food deficiency is really at the bottom of the matter. They admit that much less fresh meat was eaten at Inman Mills during the years of their enquiry. However it appears that more than half the families kept a cow and chickens though this fact does not necessarily negative the food deficiency hypothesis as it is well known that in any family the infants and the working men get the best of the food while the other members may suffer considerably. For any who may still be interested in SAMBON'S Simulium theory it may be noted that this fly was not found within the area of the enquiry.]

A D B

SILER (J F), GARRISON (P E) & MACNEAL (W J) **Third Report of the Robert M Thompson Pellagra Commission of the New York Post-Graduate Hospital and Medical School.—***Southern Med J* 1918 Dec Vol 11 No 12 pp 786-787

The report is summarised as follows —

“(1) The above study made in two small towns pellagra localities in South Carolina showed the disease to have been steadily on the increase from 1907 till 1914, this increase being less rapid, however, during the last three years.

“(2) The incidence of this disease was slightly higher in the white than in the coloured race, though the difference is gradually disappearing.

"(3) Pellagra was relatively common from the age of 1 year up till puberty, when there seemed to be an abatement during that period, after which it increased again

"(4) During pregnancy there was an increased resistance to the disease, but this in time, was followed by a decrease of resistance during parturition, when occurrence or recurrence is especially liable to take place

"(5) Studies on recovery and recurrence showed the former to be more permanent in children than in adults. As regards the latter it was found that a year without recurrence was an especially favourable omen

"(6) From the standpoint of the spread and location of the disease, the authors found that since 1914 practically all the new cases of pellagra in that community developed while the person was residing in the same house with, or next door to, a pellagum in the active stage of the disease, or within six months after such exposure. It was further noted that following the installation of a proper sewage system the spread of the disease was almost wholly arrested, all of which tends to lend support to the infection theory regarding the spread and outbreak of pellagra"

A D B

HARRIS (Seale) **Food Conditions and Nutritional Diseases in Europe, with some Remarks on the Etiology of Pellagra**—*Southern Med J* 1919 June Vol 12 No 6 pp 291-305, and *Medical Record* 1919 July 19 Vol 96 No 3 pp 89-95

The author, though not holding the belief that pellagra has for its cause a deficiency in protein diet, was sufficiently favourably impressed by GOLDBERGER's work to make a study of various European countries with respect to their war dietaries and the prevalence or not of pellagra

He remarks on the extremely poor and unbalanced diets of France, Belgium, Italy, Germany, Austria-Hungary and England. He could find no record of any condition resembling pellagra in any of these countries. Even in Italy, where some years ago pellagra was a veritable scourge, the disease has decreased enormously while other diseases in which mal-nutrition plays a part, as for example tuberculosis or scurvy, have increased

In short the experiments performed on a small scale by GOLDBERGER in America have been repeated by nature on an enormous scale in Europe during the war. The result has been that in the countries where pellagra was not known formerly no cases have developed, and in countries like Italy not only was there no increase but a decided decrease in the number of pellagums. The author holds therefore that GOLDBERGER's theory is not proven. He suggests further research along bacteriological lines both by means of dark ground illumination and by Noguchi's method for the discovery of a possible filtrable virus. [The author has not mentioned that in other places pellagra has broken out in definite epidemics presumably due to war diets. One example of this was at the Refugee Camp at Port Said and another in Turkish Prisoners of War in Cairo]

A D B

ALPAGO-NOVELLO (L.) **Il granoturco e la pellagra.** [Maize and Pellagra]—*Riv Pellagrológ Ital.* 1919 Jan-Mar Vol 19 No 1-2. pp 5-12

This article opens with an editorial introducing the author, a disciple of LOMBRIO, and his instructions to the people of Italy. These were

published some years ago and are merely reprinted for popular instruction. The information is conveyed under five headings—

1 *How pellagra develops* This needs no comment

2 *What is the real cause of Pellagra?* The author makes the emphatic statement that the disease is due to the eating of unwholesome Indian corn

3 *How Indian corn becomes unwholesome* The chief cause is damp, whether due to premature gathering, improper storing or to the use of imported corn. The dishonest miller who substitutes bad maize flour for the good corn handed to him by the peasants is also a factor to be reckoned with

4 *How to recognise bad corn* When very bad the musty smell and bad colour of the corn are obvious, but when the defect is slight the grain lacks lustre and the husk is slightly wrinkled. Green, blue or brown spots appear on the grain and when the hands are thrust into a large mass of such grain a warm damp feeling is experienced. Even oaves made from good meal may go bad in the centre owing to faulty storing

5 *How to prevent Pellagra* Banish bad corn. Refuse imported corn. Gather the grain only when ripe and while the weather is dry. If these conditions are not possible every village should be provided with a drying machine, always bearing in mind that such a machine will not make spoilt corn into good

A D B

GHIRARDINI (G. Volpi) *Sulla Pellagra in Friuli dopo l'invasione.*
[On Pellagra in Friuli after the Invasion]—*Riv. Pellagrol. Ital.* 1919 May-Aug Vol 19 No 3-4 pp 17-21

In the years 1915-1917 there was a marked decrease in the number of pellagra cases in the region of Friuli. Similar reports were received from other parts of Italy. The author in discussing this decrease in Friuli states that the peasants in the country felt the consequences of dear food less than town dwellers and that food conditions were even improved during these years owing to the Army inspection of stores, etc. However, after the invasion of the territory by the enemy very bad food conditions prevailed with the result that a recrudescence of pellagra occurred.

The author states that this was due to the fact that after the invasion the staple diet of the people was maize of the worst quality and in the smallest quantity. To show that this increase in pellagra was not only due to malnutrition he quotes the following facts: 1 In Udine though the remaining populace suffered greatly from scarcity of food and shewed signs of malnutrition no cases of pellagra appeared. 2 Among the 200,000 refugees from Friuli who dispersed to various parts of Italy where food was not plentiful no case of pellagra was reported. 3 Pellagra has been noticed in young robust subjects who shewed no signs of malnutrition. The author also draws attention to the prevalence and main symptoms of so-called war oedema.

A. D. B.

NILES (George M) **The Therapy of Pellagra Based on Eleven Hundred and Fifty Cases** — *Med Record* 1917 June 2
Vol 91 No 22 (Whole No 2430) pp 932-936

This observer bases his observations upon records of eleven hundred and fifty cases of pellagra. He divides the work under four headings — 1 Dietetic, 2 Hygienic, 3 Medicinal, 4 Climatic.

1 *Dietetic* All articles of food made from corn or corn products should be excluded from the diet. He recommends the use of meat, eggs, milk, buttermilk together with peas and beans. When gastrointestinal symptoms are severe the diet should be restricted but it should not be forgotten that in this disease the gastro-intestinal tract can stand more than might be expected. At this stage the author recommends barley gruel, rice water, the lighter cereals, thick broths, dry meat powders and similar substances. Alcohol should be used sparingly.

2 *Hygienic* Rest is most important. The confinement should be lightened by cheerful companionship. Strong light, especially sunlight, must be excluded. X-rays are extremely dangerous for pellagrins. All buccal infections, however slight, should be treated by emetine injections ($\frac{1}{2}$ gram daily for 6 days). Repeat this course if necessary 4-5 times.

3 *Medicinal* This is chiefly symptomatic. For the sore mouth and tongue nitrate of silver (20 grs. to the ounce of water) daily or mouth washes containing borax and glycerine or chlorate of potash are recommended. For the salivation give atropine injections ($\frac{1}{200}$ gram every 4 hours till dribbling ceases). For constitutional treatment the author uses hypodermic injections of Iron arsenite and Sodium cacodylate. These two drugs are given on alternate days, 16 minims of the iron arsenite solution and $\frac{3}{4}$ gram of the sodium cacodylate. This is carried out for 2-3 weeks, then every second day with the same alternation for 2-3 weeks longer, then only once a week (still alternating) for as long as is thought advisable. Internally the author recommends Fowler's solution. It is not mentioned whether this treatment is to be combined with the above but the obvious inference is that this is an alternative method. Fowler's solution is given together with a saturated solution of Potassium iodide beginning with 5 drop doses and increasing by one drop a day until the physiological limit is reached. For diarrhoea Bismuth-beta-naphthol with resorcin is given. Opium should be held as a last resource.

When free hydrochloric acid is diminished this should be given by mouth in 12 drop doses well diluted half an hour after meals.

For the aches and shooting pains aspirin can be used with success. For the skin lesions various lotions and ointments are recommended. While the skin is hot and red the following lotion is serviceable —

Pulv Calamine	4 drams
Pulv Zinc Oxide	3 "
Rose water	2 ounces
Lime water	1 pint

After desquamation 5 per cent Boracic acid ointment is effective.

4 *Climatic* A sojourn in a colder climate is beneficial. The author believes that "a pellagrin should avoid hot weather for ten or twelve months after all symptoms have disappeared."

[This paper is an important contribution to the as yet unagreed subject of pellagra therapy. There is one slight criticism that might be made and that with regard to the question of restricting the diet when gastro-intestinal symptoms appear. The reviewer is of opinion that a full diet should be maintained as far as possible throughout the disease irrespective of diarrhoea.]

A. D. B.

SULLIVAN (M.) & JONES (K. K.) **Biochemical Studies of the Saliva in Pellagra.** *Public Health Rep.* May 1919. Vol. 31. No. 20. pp. 1068-1080.

The authors made a study of the saliva in patients of the Pellagra Hospital of the United States Public Health Service at Spartanburg, S.C.

Only uncomplicated cases of pellagra were examined.

The authors summarise their results as follows:

"The rate of flow of the saliva of patients at the Pellagra Hospital was found to be occasionally very rapid, occasionally very slow, but in general it was within normal limits."

"The specific gravity of the saliva of pellagra patients tends to be higher than that of the controls."

"The total solids, ash, organic matter and mucin of the saliva is greater for the pellagrins than for the controls, but bear no relation to the mouth symptoms."

"The diastatic power of the saliva of pellagrins varies within the limits established by the controls."

"The sulphocyanic content is much less marked in the saliva of the pellagra patients than in that of normal people."

"The reaction of the saliva in pellagra is somewhat more alkaline than in that of normal saliva."

A. D. B.

MCCOLLUM (E. V.) & SIMMONDS (N.) **A Biologic Analysis of Pellagra-Producing Diets.**—*J. Biol. Chem.*, Baltimore 1917. Oct., Nov. & Dec. Vol. 32. Nos. 1, 2 & 3. pp. 29-61, 181-188, & 347-367. With 4 charts.

1. "The Dietary Properties of Mixtures of Maize kernel and Bean."

This work is divided into three papers:

From a study of the work of HOPKINS and FUNK the authors conclude that there are two as yet unknown substances which must be present in a diet in order that the life of an animal may be maintained. One of these is called Fat soluble A, found most concentrated in butter fat and egg yolk fats. The other is called water soluble B and is everywhere present in natural foods in relative abundance. Beans and maize were studied in respect of these two unknown substances. The authors find that a diet containing one seed alone fed to a young animal is not sufficient for its growth but these individual seed diets can be supplemented by "highly purified protein, pure inorganic salts, and one of the growth promoting fats so as to form a satisfactory ration for growth and maintenance." "The leaves of plants contain more inorganic salts and fat-soluble A than

do the seeds. Mixtures of beans and maize also contain too little fat soluble A "to maintain optimum well being in growing animals." In this mixture there is abundant water-soluble B. The most satisfactory mixture is 80 per cent maize and 20 per cent beans but even this needs addition for optimum growth. In GOLDBERGER'S diet which produced pellagra in experimental subjects there was deficiency of certain inorganic salts and also of fat-soluble A.

ii "The Minimum Requirements of the Two Unidentified Dietary Factors for Maintenance is Contrasted with Growth"

Wheat germ was selected as the source of water-soluble B and butter fat of fat soluble A. These two substances were given in varying proportions but always below optimum requirements. The rest of the diet consisted of constant amounts of casein, dextrin, salt and agar agar. With this diet it was found —

1 That the animal's life was in danger when the amounts of unknown A and B became so low as just to prevent loss of weight.

2 That growth is proportional to the quantities of unknown A and B in the diet.

3 That deficiency in the other factors of diet will not allow unknown A and B to promote growth as efficaciously as when the rest of the diet was generous.

4 It was found dangerous to fast an animal in respect of either A or B, and that rats thus fed showed signs of polyneuritis. Attention is drawn to the danger incurred by trying to prevent the growth of tumours by cutting down these unknown substances as has been attempted by some workers.

iii Deals with "The Values of Some Seed Proteins for Maintenance"

[These papers constitute a very carefully thought out research. Two very important lessons may be learnt from them — (1) "That there is too great a tendency to put faith in the data derived from a chemical analysis as an indication of the value of the proteins in animal nutrition." (2) That even though there be a sufficiency of fat soluble A and water soluble B in a diet a reduction in any of the other constituents will seriously lessen the efficacy of such a diet.]

A D B

CHITTFENDEN (Russel H.) & UNDERHILL (Frank P.) **The Production in Dogs of a Pathological Condition which closely resembles Human Pellagra** — *Am J Physiol* 1917 Aug 1 Vol 11 No 1 pp 11-66

The experimental production in dogs of a condition closely resembling that of pellagra in man is described. "The disease may be induced in dogs by the ingestion of a diet containing boiled peas as the chief source of Nitrogen. Under suitable conditions these nutritional disturbances may be manifested even when raw meat is included in the diet. By quantitative variations in the food intake the condition may be produced in varying periods of time ranging from one month to six to eight months." It appears from these experiments that the condition "cannot be due to the low intake of Nitrogen *per se*" nor to the result of infection. Dogs fed upon a generous supply of boiled peas lived longer than those given less but whether

the Nitrogen intake was large or small the final result was the same, viz, pellagra-like condition, though of course this was delayed in the former case. In conclusion the authors think that "the abnormal state may be referred to a deficiency of some essential dietary constituent or constituents, presumably belonging to the group of hitherto unrecognised but essential components of an adequate diet."

[In this connection see the abstract of the paper by McCOLLUM and SIMMONDS above.]

A D B

RIGNLY (Paul) Pellagra, a Clinical Study and Report of Cases—*Southwestern Med* 1918 Oct Vol 2 No 10 pp 4-9

This paper attempts to show that pellagra is a neuritis of the sympathetic nervous system following some recent acute infection. Seven cases are reported to substantiate this fanciful hypothesis.

A D B

BLIOLINI (G.) Localizzazioni Pellagiose, epoca della loro manifestazione—*Riv Pellagiológ Ital* 1919 March Vol 19 No 1-2 pp 3-5

This note consists merely in the description of the clinical signs and symptoms of a few chosen pellagrins. There is nothing worthy of remark.

A D B

SUPPLEMENT

"This from a recent issue of *Physiological Abstracts*

'Three dogs fed on the same diet with the addition of 2 to 5 per cent "Oxypan," a commercial vitamin, lived for 3 to 6 months and returned then desire for food for a much longer period.'

"With the present high cost of foodstuffs, one may question the wisdom of taking anything that will prolong the desire for food after death. Nevertheless, this chemico-physiologic achievement evokes one's admiration. Science is, indeed, wonderful." [*Jl Amer Med Assoc*, 1919 Dec 27]

PLAGUE

MAZZONE (F) [Plague in Italian Colony in Africa]—*Gaz Ospedali e d Clin* 1919 Apr 6 Vol 10 No 28 p 245 [Summarised in *Jl Amer Med Assoc* 1919 June 7 p 1709]

An account of an epidemic of bubonic plague in Cyrenaica during 1917, with map No previous disease among rodents, infection introduced by human agency

"Anti-plague vaccination on a large scale arrested the epidemic after it had caused 108 deaths in 173 cases among 2,350 Arabs not vaccinated, and 26 deaths in 93 cases among the 11,836 Arabs that had been vaccinated"

There were 12 cases of plague, with one death, among 7,110 Europeans protected by "vaccine", and 850 who had not been protected escaped infection The author considers that anti-plague vaccination is of great value both for prevention and treatment

[Cf JACKSON, this *Bulletin*, Vol 9, p 502]

J H T Walsh

LAVEAU (M) Epizootie pesteuse dans la région du lac Tamnah (Cercle de Thiès) Développement parallèle de la peste humaine — *Bull Soc Path Exot* 1919 June Vol 12 No 6 pp 291-296

Reappearance of epidemic plague in the Tivaouane circle in February coincided with an abnormal influx of rodents attracted by a plentiful supply of ground-nuts (*Arachis hypogea*) The author was deputed to examine the rodents for signs of plague No dead rats or mice were found in this circle nor were any plague bacilli found in any of the 70 animals examined — rats, mice and voles The stomachs of the rats were engorged with ground-nuts

The inhabitants of the Thiès circle near to lake Tamnah also suffered from plague and in the neighbouring jungle dead bodies of rats, mice, palm-rats and hares were found

Thirty-eight animals from this area were examined and of this number three rats and a palm-rat (*Sciurus palmarum*) were found infected with coccobacilli resembling Yersin's plague bacillus These microbes were Gram-negative, stained readily with carbolised thionin and produced bubonic plague in healthy rats and mice Bacilli from infected rodents were agglutinated by anti-plague serum As the result of his investigations M Laveau concludes that the epizootic disease among the rodents gave rise to the epidemic in the Thiès circle and that the outbreak in the Tivaouane area was caused by interhuman infection

J H T W.

WU LIEN TEH North Manchurian Plague Prevention Service.—*National Med Jl. of China* 1918 Dec Vol 4 No 4 pp 132-139

This is the sixth annual report of the "Prevention Service," containing details for the year ending with September, 1918. In December 1917 missionaries, residing in Mongolia, reported an epidemic resembling pneumonic plague Dr Wu Lien-Teh left Peking in January

1918 and diagnosed pneumonic plague in a passenger leaving a train at Fengchen station. The epidemic was widely spread and cases were found in various villages belonging to eight provinces — S. Mongolia, Suviuan, Chahar, Shansi, Chihli, Shantung, Anhwei and Kiangsu. Prompt action was taken by the Ministry of the Interior and medical aid was called in from all available sources. So far as information was obtainable it appeared that the epidemic started near the small town Pat ebolong in S. Mongolia and from there it travelled eastward. No rodents or insects played any part in the transmission of the infection. The epidemic was finally stamped out in April with the loss of fifteen thousand lives. During the year to which this report refers no sign of bubonic or pulmonary plague was found throughout Manchuria, "thus making 1918 the eighth clean year so far as this dread disease is concerned." The rest of the report deals with influenza, scarlet fever, small pox, &c., and with sanitary and administration problems.

J H T W

PIC (A. B.) *Notes sur la peste au Binh-Thuan. (Sud-Annam)*
Ann d'Hyg et de Med Colon 1914 Vol 17 No 3 pp 767-797 [Received May 1919]

THIERY *Rapport sur l'épidémie de peste de 1913 dans la Delegation de Phanran (Annam)* — *Ibid* pp 798-809 [Received May 1919]

These two papers contain accounts of plague epidemics which although presenting nothing that is new, are of considerable value from their historical and statistical contents. They also contain sections dealing with Etiology, clinical aspects and prophylaxis.

J H T W

YOUNG (Anne) *Clinical Similarity between the Influenza Epidemic and Plague* — *New York Med Jl* 1919 May 17 pp 856-857

This very interesting and suggestive paper is based upon the inability of the author and others to fix or discover the causative microbe responsible for the "influenza" epidemic of 1918. Douglas Symmers (no reference) is cited as one who had called attention to the similarity between the pathology of pneumonic influenza and pneumonic plague. Dr. Young's work was cut short by an attack of the anomalous malady, but she had then seen 900 cases, enough she thinks, to "permit the statement that clinically many resemble plague."

"One and the same organism is responsible for all four types of Plague: 1, ambulatory, 2, bubonic, 3, septicemic, and 4, pneumonic." Referring to Nos. 3 and 4 the author writes:

"The septicemic form manifests a more pronounced onset and set of symptoms, small hemorrhage take place internally on mucous membrane and in the skin. This type probably gives rise to the term "black death." The pneumonic form is a septicemic plus lung localization with a mortality seldom below seventy per cent. [While admitting a clinical resemblance in certain cases of influenza and pulmonary plague similarity of infection is not proved nor does the author tell us what bacteriological investigations were carried out.]

J H T W

LEE (S T) **Some of the Different Aspects between Influenza, Pneumonia, and Pneumonic Plague** - *New York Med J* 1919 Sept 6 Vol 110 No 10 pp 101-103

The author presents a survey of epidemics of pneumonic plague in China, followed by a picture of an influenza epidemic in China. It is from these observations that he draws his conclusions in differentiating the forms of pneumonia.

In the first place there are clinical differences between these two kinds of pneumonia. In influenza we usually have a longer period preceding the manifestation of lung symptoms, a catarrhal stage, with fatigue and nervousness more marked. When pneumonia does occur it develops clearly as a secondary complication. In plague these features (preliminary indisposition, sneezing and cough in cases of influenza) are very different, the lung symptoms are primary. A clinical synopsis of pneumonic plague shows that the patient always complains of headache and loss of appetite, often thirst and nausea, joint and muscle pains and sometimes epigastric pressure. The temperature varies between 36°C and 40°C , the pulse is rapid, soft and fluttering, after these symptoms, lasting from twelve to sixteen hours, the patient begins to present pneumonia symptoms followed by cyanosis and then cardiac asthenia which leads to death. Only a few hours pass before the appearance of bloody sputum. The course of plague pneumonia is shorter than that seen in influenza, sixty per cent of the patients died within forty eight hours, 16% within 24 hours, 16% within 72 hours. From the first appearance of bloody sputum the average duration of 150 cases of pneumonic plague was forty-eight hours, and of 30 cases with influenza pneumonia the duration was $3\frac{1}{2}$ days, all the cases terminating in death. The recovery from pneumonic plague is almost nil, only two patients in 72,000 cases.

Pathological differences - Association of pyogenic organisms is found in both forms. In influenza we find pus in the lung tissues, in plague pus is not formed, only the highly red, hepaticized lung is seen.

J H T W

Moss (Lovel) **A Case of Bubonic Plague** - *II Roy Nav Med Serv* 1919 Oct Vol 5 No 4 pp 130-132

"T H, aged 19 deckhand R N R T was admitted to the Royal Naval Hospital at Gibraltar, on the evening of May 9 as a case of pleurisy. His ship was on her way home from the Eastern Mediterranean, having called in turn at Beirut, Port Said and Malta, and on the passage from the latter port to Gibraltar, on May 7, he was suddenly seized with repeated attacks of shivering, followed by vomiting, pain in the back and limbs and headache."

Temperature on admission 103°F , pulse 116, respirations 36, the lungs revealed a harsh respiratory murmur and general subintentionality. An hour later - temperature 102°F , pulse 110, respirations 44. May 15th, low muttering delirium and "typhoid" state, little sleep and diagnosis obscure, a small bubo was noted in the left groin. On the 16th, a small enlarged, tender gland appeared under the right mandible. In the left groin the skin was red and oedematous, pitted

on pressure showing signs of an abscess. The same evening a chain of hard, discrete and acutely tender glands was discovered in the left axilla. It was decided to incise the bubo in the left groin. No pus was found but the glands were enlarged, inflamed, friable and necrotic. Films showed "a mixed infection of Gram-positive cocci and a few ovoid Gram-negative polar staining organisms measuring on an average 1.5 by 0.5 μ ". Symptoms went from bad to worse. May 20th, delirium and incontinence of urine continued, temperature 105° F, pulse 140, respirations 28. In addition to a hemorrhagic rash there was now a pustular eruption about the face and chest. Death occurred on May 21st.

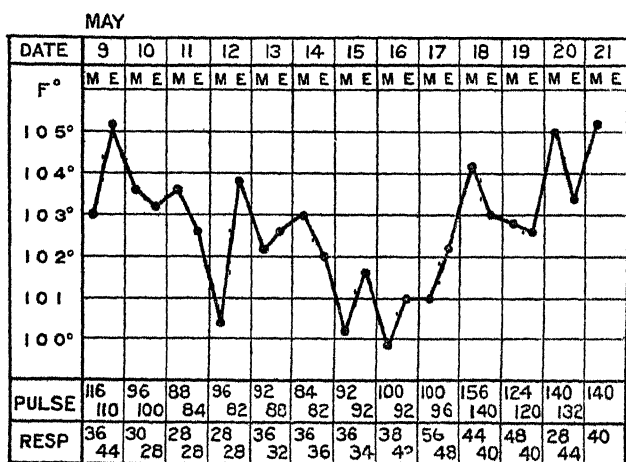


Chart of Case of Bubonic Plague (Moss)
[Reproduced by permission from the *Jl Roy Nav Med Serv*]

A guinea-pig was inoculated on May 17th. It died on the 20th.

"Cultures from the heart blood contained only bipolar, ovoid bacilli indistinguishable from *B. pestis*. Microscopically similar bipolar staining organisms were found in smears from the heart blood, spleen and bubo of the guinea pig."

"A white rat inoculated on May 17 from the human glandular tissue emulsion was alive on May 24 apparently in good health. The organism recovered from the heart blood of the guinea pig gave the cultural reactions of plague bacilli and the culture inoculated into a white rat caused death in four days with the characteristic post mortem appearances of plague; typical plague bacilli were recovered from the heart blood."

J. H. T. W.

BOMBAY Report of the Bombay Bacteriological Laboratory for the Year 1917 [By Lt Col W. Glen LISTON, C.I.E., M.D., D.P.H., I.M.S.] 8 pp. 1919, Bombay. Printed at the Govt. Central Press. [Part I. Plague.]

The Director, Lt-Col W. Glen Liston, and his assistants will excuse some unavoidable delay in referring to this report which contains a record of hard work in more than one department. The out-put of

doses of anti-plague vaccine from 1913 to the end of 1917 is shown in the following table —

1913	1914	1915	1916	1917
795,637	812,942	827,407	1,404,003	1,821,661

“ Since the opening of the Laboratory in 1896 16,295,867 doses of ‘ vaccine ’ have been sent out ”—about one dose to 20 million people, but the work shows encouraging progress in a country always opposing sanitary and prophylactic measures! The next table given in the Report describes the distribution of the vaccine in the various Presidencies, in the “ Native States,” in “ Ceylon,” in “ Countries outside India ” and in “ Portuguese Territory in India ”, “ the Native States in India make use of inoculation as a protective measure against plague, to a greater extent than any Presidency or Provinces in India ”

Statistics of Inoculation

“ It has not been possible to collect this year satisfactory statistics regarding inoculation. Replies to a circular letter issued from this Laboratory to all who had received antiplague vaccine were frequently couched in the terms contained in the following letter from the Civil Surgeon, Dharwar —

“ With reference to your letter dated 22nd February 1917, I have the honour to inform you that I cannot give you any statistics which are worth anything

“ In nearly every case the Sub Assistant Surgeon of a Dispensary comes to a distant village, inoculates all he can and hurries back again. He has no time to do anything but count the people and take the names and has no opportunity of seeing them again

“ All I can say is that the people of this district have learned by experience that inoculation is a good thing and that the demands for visits from inoculators are in excess of what we can comply with ”

Other letters are cited showing that obstruction and dislike of inoculation are slowly disappearing. The Health Department of the City of Bombay sends to the Laboratory all rats found dead or caught alive within the municipal limits. During 1917, 995,642 rats were received, 302,150 were alive, the rest dead when received, of the latter 501,742 were examined and among them 11,175 were found to be plague infected

“ During the year 28 medical gentlemen attended the Laboratory for a course of instruction in the technique of inoculation ”

[The remainder of the Report is noticed elsewhere]

J H T W

MONZIOLS & BROCA Quelques réflexions sur la sérothérapie anti-pesteuse à l'occasion d'une petite épidémie de peste bubonique observée en Orient -*Bull et Mém Soc Méd des Hôpt de Paris* 1919 Apl 17 3rd Series Vol 35 No 13-14 pp 320-322

Passing from a brief description of the clinical signs of bubonic plague the authors observe that the patient does not always at first draw attention to the bubo and that unless systematic search is made it is easy to err in diagnosis. In 21 cases which passed through their hands the bubo was unilateral in 18, and bilateral in 3 cases. The buboes were all in the inguinal region and, in more than half the number of cases, had suppurated. The authors deem it desirable to incise the bubo as

soon as fluctuation is noted. They used anti-plague serum or ether for "dressings" and the cicatrices were firm and linear. In one case where the incision was delayed and sloughing occurred the edges of the wound were brought together with plaster and firm cicatrization rapidly ensued. In the early stages the gland was punctured with a fine needle attached to Luer's syringe. Yersin's bacillus was generally found which, when sown on agar, produced characteristic colonies in forty-eight hours.

As treatment the earlier patients received 40 cc. of anti-plague serum intravenously and 20 cc. subcutaneously during 24 hours. These doses were repeated daily until defervescence set in. In one of these early cases the above doses given for three days and followed by intravenous injections of 40, 40, 20 and 20 cc. of anti-plague serum caused a rapid fall of temperature and general improvement, but when the injections were stopped the temperature again rose to 39.5° C. and a relapse occurred. One injection of 60 cc. was then given intravenously. This caused a fall of the temperature, and after five daily doses of 20 cc. the patient recovered. The authors are convinced that this method of treatment is harmless and very efficacious, and they finally adopted the following routine method—

Having, when possible, established the diagnosis bacteriologically they injected into veins 100 cc. of serum and repeated this dose every twelve hours. Thus during the first day the patient received 300 cc. If after the first three injections, generally enough to strangle the infection, the temperature had not fallen and other symptoms improved the treatment was omitted for 24 hours, after which interval another injection of 100 cc. was given. It was rarely necessary to continue these large doses of serum and the treatment usually concluded with injections of 10 and 20 cc. given every second day. According to the gravity of the case the total quantity of serum injected varied between 300 and 500 cc. more or less. Early presence of albuminuria is not a contra-indication in serum treatment. "In one of our latest cases, a serious one, the albumen disappeared after the second injection."

From October 1st to November the 28th, 1918, 21 cases were treated, with 5 deaths.

J. H. T. W.

KRAUS (R.) Estudios epidemiológicos. Sobre el suero antipestoso preparado con bacilos muertos y su aplicación en dosis masivas en la peste bubónica (*Método Penna*). [Studies in Epidemiology. Anti-Plague Serum prepared from Dead Bacilli, used in Massive Doses.] [Conclusions in German, French and English].—*Revista del Instituto Bacteriológico* 1919 June Vol 2 No 2. pp. 125-150.

The author discusses the values of various anti-plague serums and "vaccines" prepared with living or attenuated bacilli and compares the recorded results obtained with those which follow the employment of serum prepared from dead bacilli. He describes and considers Dr PENNA's method of employing massive doses.

His conclusions are—

"From what has been said above it can be deduced that efficiency of antiplague serums differs according to the countries in which it is applied

owing probably, to the nature and intensity of different epidemics. One of the most favourable statistics is the one obtained by intensive intravenous treatment (Penna's method) applied in Buenos Aires. In India the results are not so favourable although Closky used high doses, the mortality being higher than is observed in the Argentine Republic. In this country mortality varies according to the intensity of different epidemics from 4.4% to 22%. Anti-plague serum prepared with dead germs gives the same results as Paris Pasteur Institute serum prepared with live germs.

Penna's method, consisting in high intravenous doses of serum can be used without danger and gives excellent results.

A problem still to be resolved is international standardization of anti-plague serum."

J H T W

WILLOUGHBY (W M) **Plague Rats on Shipboard** [Correspondence]
—*Brit Med J* 1919 Sept 13 p 361

On page 276 of the *British Medical Journal* for August 30th there appeared an account of plague in the ss *Nankin* on arrival at Alexandria from London, containing the following paragraph—

"The most probable explanation seems to be that infected rats got aboard either on the Port of London or that of Marseilles." Dr Willoughby, Medical Officer of Health, Port of London, considers it improbable that the infected rats came from either of those ports. In support of his opinion he relates certain facts known to him—

1 A ship came from Bombay to Middlesburgh, discharged freight there, and came to London. This ship landed plague rats in London.

4 A ship came from Bombay to Middlesburgh where she discharged cargo, from Middlesburgh to London where she loaded cargo, on the return voyage to Bombay she had plague on board.

5 A ship went from Alexandria to Montreal and discharged cargo in Montreal. On arrival in Bristol she had cases of plague on board.

6 A ship went from Calcutta to Buenos Aires, was fumigated in Buenos Aires *with cargo in situ* and came to London. While lying in London she had plague on board.

7 SS *Nankin* came from India to London discharged cargo, and on the return voyage to India had plague on board. Common to all these cases is the fact that they came from endemic centres of plague.

"When plague rats board a ship with the cargo at an endemic centre, plague may reach the ship's complement either during the voyage to the port of discharge, or during the stay of the ship in that port, or during the outward voyage of the ship from that port, very often it does not reach the ship's complement at all."

The pest is driven to the surface—that is, from the hold to the deck on discharge of the cargo and consequent disturbance of the infected hold rats."

The disturbed hold rats infect pantry, food store, and other deck rat communities on board. This infection and the further passage to man often takes sufficient time for the ship to have left the port of discharge and reloading where the disturbance of the infection has taken place. This port then wrongly incurs the odium of the infection which has been acquired abroad."

The author adds that search has been made for mortality among rats and for infected rats in the port sanitary district but nothing of the kind has been found for a long period.

[See this *Bulletin* MANNING, Vol 8 p 260, CREEL & SIMPSON, Vol 11 p 464.]

J H. T. W.

DE MELLO (Froilano) & PARRAS (Antonio) *Estudos experimentais sôbre o valor insecticida e bactericida dos processos empregados em Goa nas desinfecções antipestosas — Quelques expériences sur la valeur insecticide et bactéricide des procédés employés à Goa dans les campagnes antipestueuses — Arqum Hyg e Path Exot* 1918 Mch Vol 6 pp 71-132 With 15 charts

Since 1896 there have been several outbreaks of plague in Goa. Various methods have been employed and the infection has been extinguished but as the various means used were not submitted to experimental testing and control their value lacked satisfactory proof. The object of these investigations is therefore to submit reported facts, ideas and hypotheses to control by means of experiments.

Series 1—Disinfection with smoke from burning hay or straw in rooms with cement or mud and cow-dung floors. Glass tubes containing fleas, bugs and mosquitoes, etc., tubes of paraffin melting at 55° 56° C. and tubes containing agar melting at 60° C., cultures of *B. typhosus* and the cholera vibrio.

Results—Disinfection by burning hay as employed in Goa is a powerful insecticide developing a temperature over 100° C., to a height of 4 meters. The method is convenient and cheap. The smoke and heat destroy the cholera vibrio, but do not kill *B. typhosus*. The hay or straw is spread on the floor to a depth of 5 cm. and all apertures are closed. Time 4 to 5 minutes for burning.

Series 2—Sulphur burned (a) in an iron vessel, (b) in a similar vessel placed over one containing water. 2 kgm. of sulphur were used to disinfect a railway wagon more or less closed. Time one hour in Exps. i to iv, 2 hours in Exps. v and vi.

Results—Of no value as bactericide, rats and insects destroyed only where the sulphur fumes have acted for at least 2 hours. In Exps. i and ii rats and mice were alive at the end of one hour.

For disinfecting suspected articles in villages where proper stoves are not available—*Exp. viii*. In a large wardrobe of which all cracks and crevices had been sealed up, 3 glass tubes containing fleas and pieces of gauze enclosing these insects were suspended and exposed to sulphur fumes for two hours, 80 gm. of sulphur to the cubic meter.

After 15 minutes all the fleas were killed, paraffin (m.p. 35°) melted, paraffin (m.p. 56°) unchanged. The death of the fleas was due to the sulphur and not to the temperature.

Series 3—Sulphur fumes developed from a "Clayton-II" in a railway wagon of 24 ½ cubic metres.

Group A—10 to 15 minutes fleas, etc., alive—20 minutes, fleas killed. Cloth, cereals, leather and gutta percha were not injured. Copper, nickel and silver are blackened unless previously covered with a thin layer of vaseline.

Group B—Effect of sulphur burned in "Clayton-II" on bacteria. Up to 6 hours no effect was produced on culture tubes containing bacteria.

Exp. ii—Duration of Claytonisation 6 hours.

Culture	Tube	Result.
Cholera	open	dead
"	closed	"
"	open	"

Groups C & D—Disinfection of baggage and merchandise in which rats had been found (e.g., merchandise arriving from Darwar). Experimental results after Claytonisation of railway wagons containing imported merchandise, rats, fleas, bugs, etc. Animal and insect agents capable of transmitting plague infection by way of baggage, etc., were destroyed by sulphuration during 20 minutes. The fumes even after six hours exposure did not damage either baggage or merchandise, nor were the germinative properties of cereals altered.

Group E—The "Clayton-II" apparatus was used to disinfect a small shop in Margao (about 45 cubic metres). Fleas, flies, bugs and mosquitos were killed after fumigation for 20 minutes.

The numerous "tables" and charts contain full details of the experiments abridged in this review.

J H T W

HIGHT (H Campbell) Plague in Bangkok City—*Med Jl of Siamese Red Cross* 1919 Apr., Vol 2 No 1

The author, Principal M O of Health, gives a detailed account of the first appearance of Plague in Bangkok in 1904 and the progress of the disease. There is nothing new in the report.

J H T W

CHOLERA

1. GREIG (E D W) **Recent Researches on the Etiology of Cholera** — *Edin Med Jl* 1919 July Vol 23 No 1 p 4-22 With 5 charts & 2 plates
2. — **L'étiologie du cholera.** *Bull Office Intern d'Hyg Publique* 1919 Aug Vol 11 No 8 pp 879-887

A resume of a conference held at the University of Edinburgh in May 1919. Many references are given to articles which Col Greig contributed to the *Ind Jl of Med Research* for 1913 and following years. Tables, charts, etc., are omitted from the French version. Greig's researches extended from 1912 to 1916 and dealt with

(1) *The effect of the rapidity of transportation on the propagation of cholera*. In addition to transport of infection by roads, ships, and railways, aeroplane traffic may possibly become a source of danger.

(2) *Importance of pilgrimages in India as means of spreading cholera*. The author draws special attention to the immense crowds visiting the temple of Jagannath in Puri and states that during his residence in Puri he examined, bacteriologically, a certain number of cholera convalescents just before they returned to their villages. The results showed that 30 per cent of these pilgrims were infected and excreted the vibrio in their stools. They were mainly travellers by railways, returning to their villages in even the furthest parts of India to form centres of infection.

(3) *Carriers of the cholera vibrio*.—At the time Greig began his investigations it was generally held that the "comma" bacillus was more or less confined to the alimentary canal but as his work progressed he found that this conception was incomplete. Examination of the various organs in fatal cases showed that the germ had invaded the tissues. The vibrio was present in the gall-bladder in 80 out of 271 cases and in 12 signs of cholecystitis were visible to the naked eye. A section of the gall-bladder demonstrated that the greater part of the endothelial layer was destroyed and vibrios were present in the exposed tissues. In the sub-epithelial layer a reaction of cell growth was observed. Higher magnification showed definitely the presence of cholera bacilli in the deeper layers of the wall of the gall-bladder. Discovery of the germs in the bile was a result of importance because it provided exact information concerning the pathology of "carriers". The bile is even a more favourable site for the development of the bacillus than the digestive tube since extraneous germs are absent. In the intestines, on the contrary, certain organisms occur which are inimical to the development of the "comma".—*B. pyocyaneus*, *B. proteus*, *B. lactis aerogenes*, *B. faecalis*. With chronic "carriers" the vibrio finds a home in the bile where it may dwell for long periods, escaping from time to time into the intestines and outside the body to become the origin of fresh epidemics.

(4) *Production of a "carrier" by experiment*. Live bacilli, from cultures, were injected into the ear of a rabbit, they passed on into the bile from which they could be obtained in pure culture. If a section of the gall-bladder of such an animal is examined, the



Portion of Wall of Gall bladder of Cholera Case (High Power)

Cholera vibrios seen on surface of epithelial layer and in submucosa
some of the cholera vibrios are swollen

- (a) Portion of epithelial layer
- (b) Submucosa
- (c) Cholera vibrios

[Reproduced by permission from the *Edinburgh Medical Journal*]

epithelial layer is seen to be damaged and a number of round cells appear in the sub-epithelial layer. The blood vessels in the wall are congested and under a higher power the germs become visible, even in the vessels themselves. If the injections into the veins are repeated, further marked changes occur. Signs of cholecystitis and the formation of calculi round a nucleus of bacilli. The author has found biliary calculi containing germs in rabbits which had received the last inoculation a year previously.

(5) *Presence of the vibrio in the lungs*. During the early days of convalescence pneumonia is a common complication, often a fatal one. Sections of the lungs show the alveoli filled with exudation and cells and minute points of consolidation are present. The "comma" can be seen in the cellular exudations proving that the germ can penetrate the pulmonary tissue.

(6) *The vibrio in the urine*. 55 cases were examined and in 8 of these the bacillus was isolated from the urine. Two of these patients had completely recovered and were at work.

(7) *Bacteriological examination of the blood in cholera*. In a certain number of cases attempts were made to isolate the germ but always with negative results. Dr Greig thinks "it probable that the vibrio passes by way of the lymphatic system rather than through the blood vessels" [Cf SANARELLI, this *Bulletin*, Vol 14, p 179]. As the result of these researches the author puts forward "a new conception of the pathology of cholera," viz.—That the infection is general and the point of origin in the intestines, thus resembling typhoid and para-typhoid fevers. Moreover it seems to him evident that, accepting this new theory, we must revise our ideas on many points which concern the etiology of cholera.

(8) *Agglutinins in the blood*. In many cases the amount of the agglutinins was determined daily from the first day of the illness. In one series of mild cases with rapid recovery the titre of the agglutinins was very high. In fatal cases the antibody response is practically negligible.

(9) *Pseudo-cholera vibrios*. Since a serum of strong power has been found an important aid in the identification of the vibrio the presence in the excreta of vibrios with characters allied to the type germ complicates the diagnosis. Morphologically these organisms are very like the true "comma" but they are not agglutinated by a serum which will agglutinate the typical germ, they haemolyse the red corpuscles which the "comma" does not affect. These pseudo-"comma" may be (a) True cholera germs which have lost certain attributes, or (b) Foreign bacilli partly "humanised".

Greig has found in Calcutta during the annual return of infection in the spring "every year the same phenomena as the epidemic increased. In the 'rice-water' stools only true cholera vibrios were found." But as it reached its turning point and during its diminution pseudo-choleraic germs began to appear together with the type organisms. And gradually, as the epidemic decreased, this race of vibrios became more numerous. Studied from a serological point of view the author was able to arrange these atypical vibrios in certain groups.

CHART 1.—Showing the Agglutination Titr. of Cholera Cases Day by Day from the First to the Eighteenth Day of the Disease
Note—The sera of normal persons may agglutinate the cholera vibrio in dilutions on and below the horizontal line

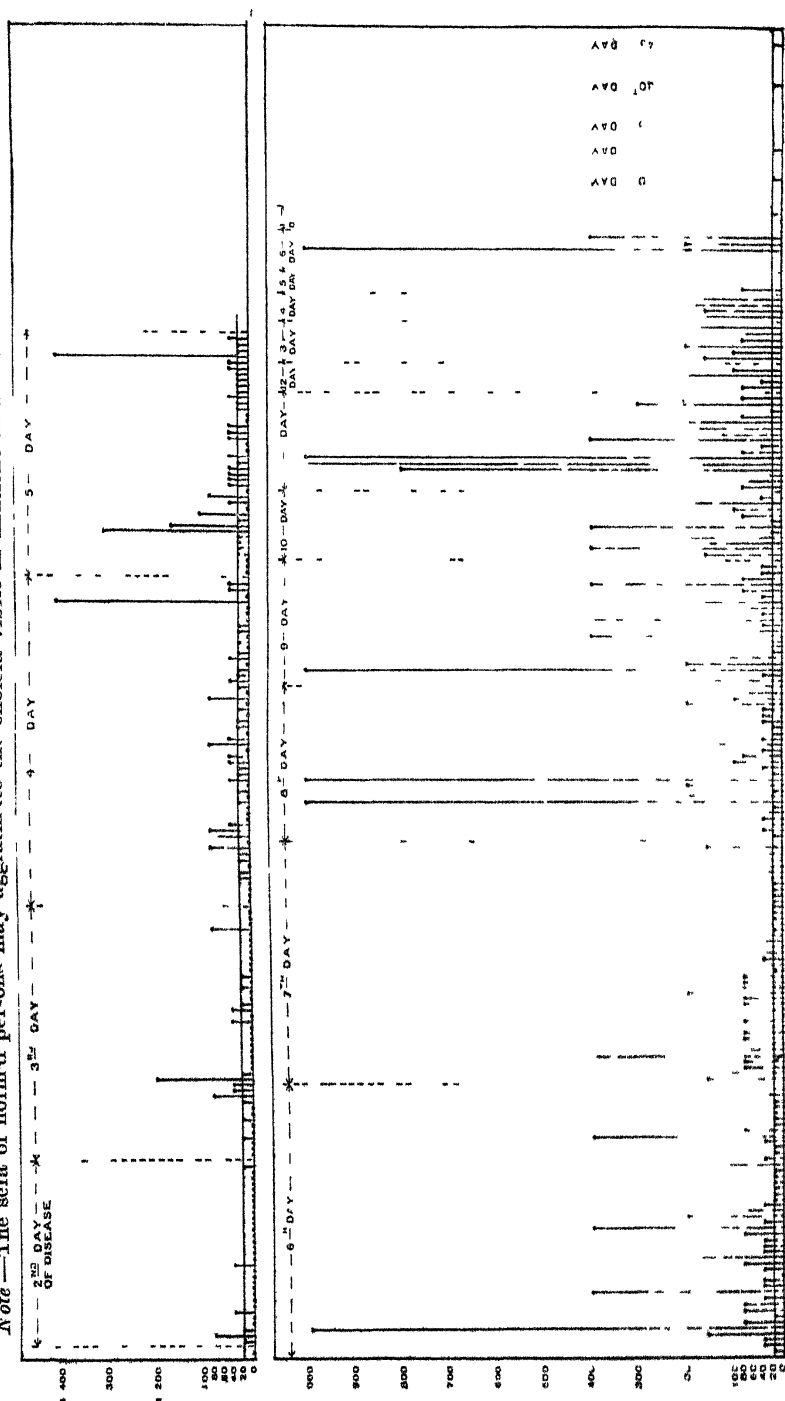


CHART 2—Showing Agglutination Titra of Sera of Cholera Cases which made a Rapid and Satisfactory Recovery
 Note—The quantity of agglutinin produced is considerable

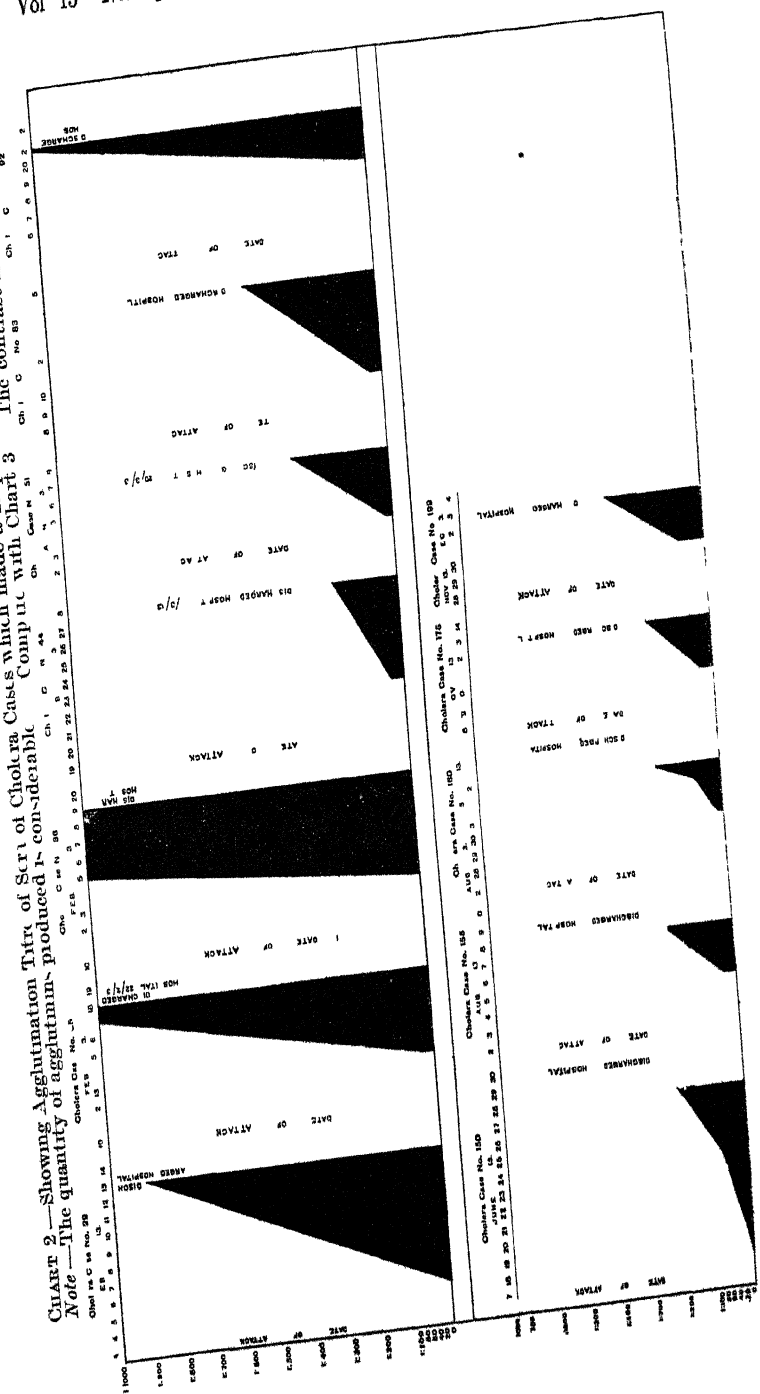


CHART 4—Showing (1) Agglutination Curves of Serum of Rabbits Immused with Cholera like Vibrios from Water with the strains and the true Cholera Vibrio (2) Weight Curves in both Experiments

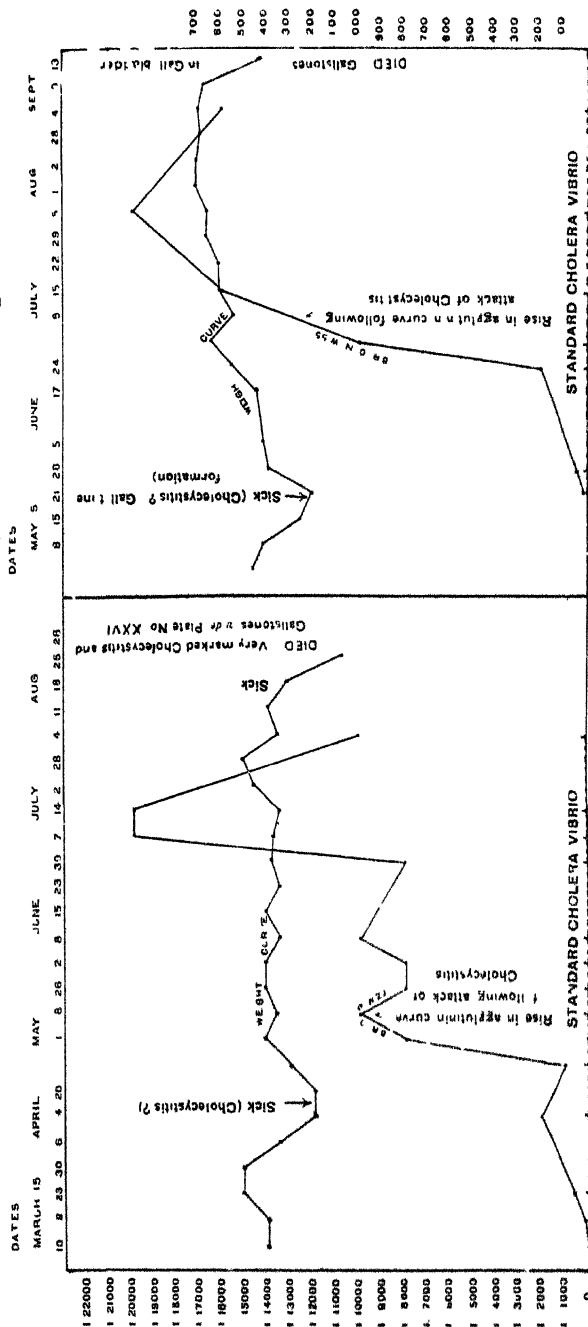


Fig. A
Result, similar to those not d in Fig. A

Fig. B

Note.—That the agglutination titers rise rapidly after attack of cholecystitis (confirmed post mortem).
No agglutinins against the true cholera vibrio are produced, an important point in the differentiation of cholera and cholera like vibrios

[Charts 1 to 4 are reproduced by permission from the *Edinburgh Medical Journal*]

CHART 3 Showing Agglutination Titre of Sera of Cholera Cases ending Fatally

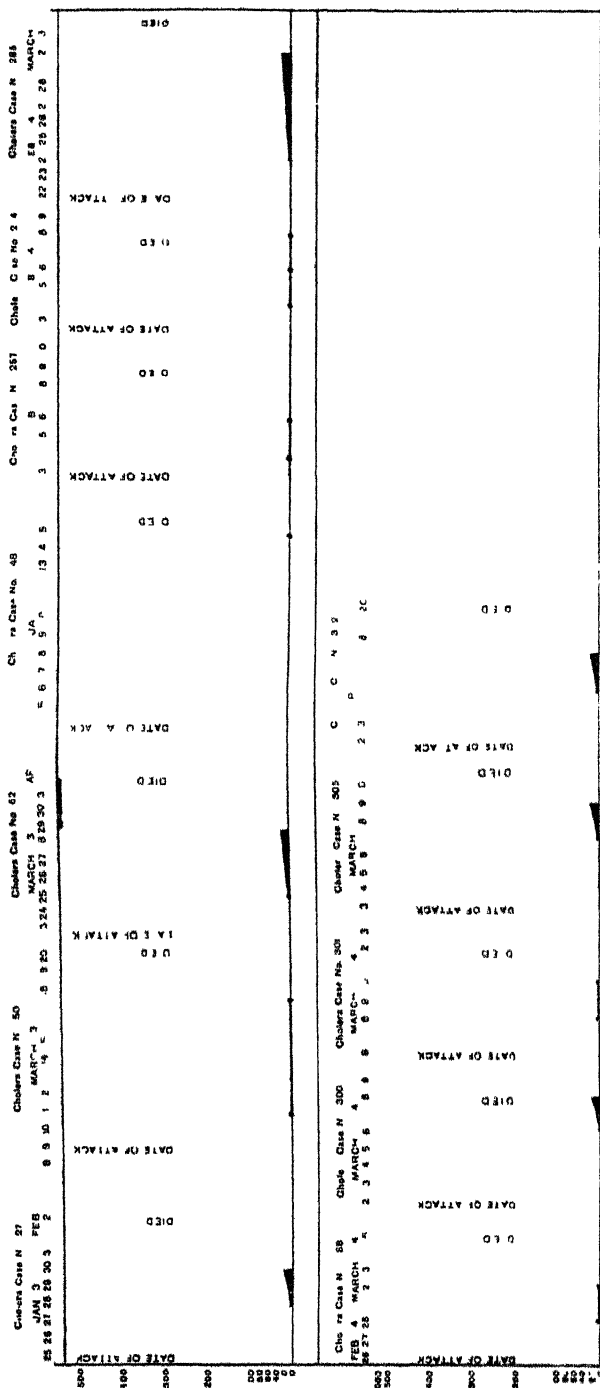


CHART 4—Showing (1) Agglutination Curves of Serum of Rabbits (Immunised with Cholera like Vibrios from Water) with these Strains and the true (holera vibrio (2) Weight Curves in both Experiments

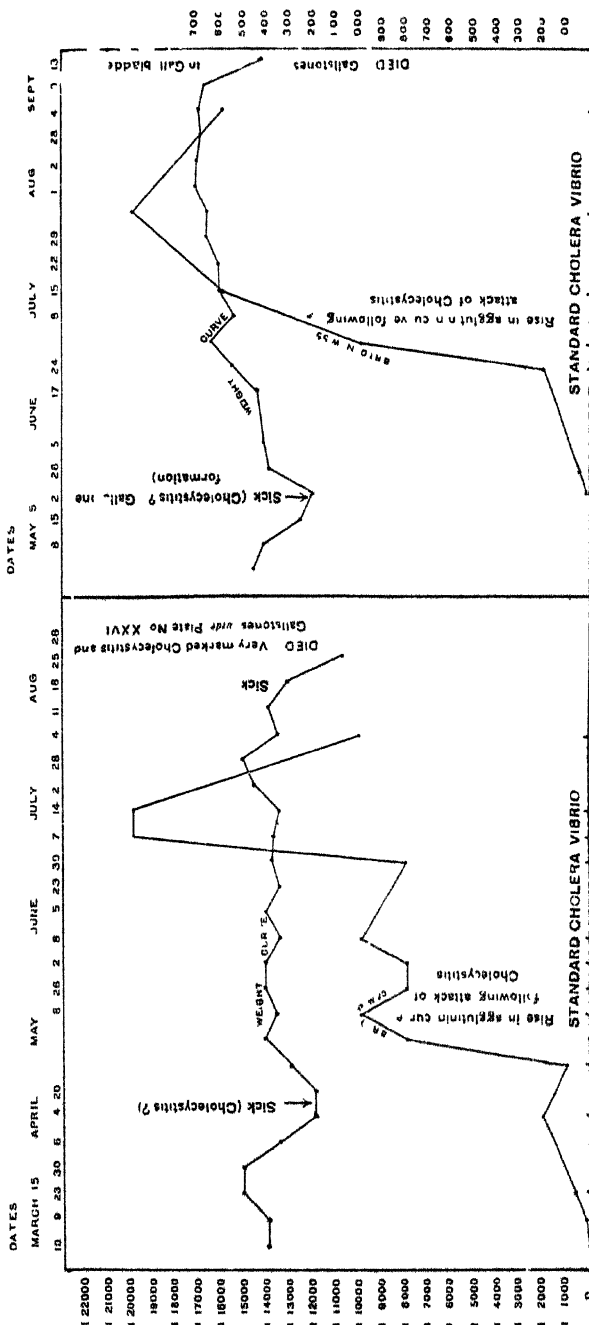


Fig A
Results similar to those not d in Fig A

Note—That the agglutination titre rises rapidly after attack of cholecystitis (confirmed post mortem)

No agglutination against the true cholera vibrio are produced an important point in the differentiation of cholera and cholera like vibrios

[Charts 1 to 4 are reproduced by permission from the *Edinburgh Medical Journal*]

(10) *Vitality of cholera vibrios outside the human host*—Upon this point earlier experiments are not quite reliable because, in most instances, old cultures were used, cultivated for long periods in artificial media. For such experiments it is essential to use "non-cultivated" races, that is to say strains not raised in artificial media. (Freig employed "comma" bacilli isolated from the "rice water" stools. They were preserved, in a dark place, in flasks kept at the temperature of the room. The number of germs in the dejections was counted daily until the vibrio was no more seen [see this *Bulletin*, Vol 6, p 37]. Temperature plays an important rôle in the duration of the extra-corporal life of the "comma". In Calcutta during the cold season this life is longer than during the hot season. The critical months are the coldest months, because the risk of infection increases owing to this extension of extra corporal life.

J H T Walsh

RENAULT Une épidémie de cholera a Pondichéry en 1913 1914
Essais de traitement par le chlorhydrate d'émétine *Ann
d'Hyg et de Med Colon* 1914 Vol 17 No 3 pp 751-756
[Received in May 1919]

Major Renault of the French Colonial medical service, begins his article with some general consideration of the history and pathology of cholera in India. He next describes a small epidemic in the town of Pondichery. The infection was imported by a pilgrim from British territory. This outbreak was local and soon checked but there can be little doubt that infection from this area caused the more serious epidemic which appeared later and spread over the whole colony. The malady lasted for five months and caused one thousand deaths. "During the early days of the epidemic the malady was of a mild character with premonitory diarrhoea. Little by little the cases became more severe and rapid in progress, from the first the symptoms allowed no doubt as to the nature of the disease—rice water stools, slight vomiting, early algid stage." The general lines of treatment— injections of serum, oil of camphor and anti-cholera mixtures are noted. [No mention is made of injections of saline solutions or of the use of alkalies.] The point of interest is the treatment of a certain number of cases with emetine hydrochlorate and the reasons for adopting this method.

The antidiysenteric and cholagogue properties of emetine caused us to employ it against cholera. It acts specially in rapidly diminishing cholera and the number of stools, modifying their nature. Starting from this principle that the profuse diarrhoea in cholera driving away the fluid blood serum, rapidly exhausts the patient leaving him neither the time nor the strength to react against the virus, we asked ourselves if we could not find in emetine a means of arresting the intestinal flux."

"The salt used was emetine hydrochlorate (a solution of 1.0 gm. in 1000) in hypodermic injections, in the following doses—

Over 25 years of age	(daily, one or several injections)	40 cc
From 15 to 25 "	" "	30 cc
" 8 to 15 "	" "	20 cc
" 1 to 8 "	" "	10 cc

This dose could be repeated the following day and the day after according to the evolution of the malady, that is to say especially

according to the diminution of the stools and the state and appearance of the urine. One "indispensable condition for success is to commence the treatment before the algid stage appears or there is anuria." Together with emetine other remedies were given.

"The effect of the emetine shows itself in the production of bilious stools two or three hours after the injections."

Fifty-nine patients were treated with emetine. Of this number 43 recovered. The appearance of bile in the stools was always favourable for prognosis [cf this *Bulletin* VIOLLE, Vol 8, p 158, CROWELL & JOHNSTON, Vol 11, p 119].

If these results are confirmed the treatment will be of great value in the early stage of cholera, and it is only in that stage that Major Renault used the drug with good results.

J H T W

DE MELLO (Fioniano) **Rapport sommaire des Etudes concernant la nature des soidisant diarrhées cholériques de l'Inde Portugaise** — *Bol Ger Med e Farmacia* (Nova-Gioa) 1919 Apr Ser 5 No 4 pp 131-141

On arrival in the Colony the author found that the terms "Cholérine" and "choleraic diarrhoea," so frequently employed, caused confusion in diagnosis. Often a case described as "cholera" by some persons was classed as "choleraic diarrhoea" by others. Instances are given in illustration of the "confusion" noticed by De Mello, together with details of the various epidemics investigated. Cultures made from these dubious cases in various areas were sent to Lt-Colonel GREIG I M S, Director of the Kasauli Institute, for identification. Results (Reply dated 13 12 18)

Ponda	<i>True cholera vibrio</i>
Gudden	<i>True cholera vibrio</i>
Mapuçi	<i>True cholera vibrio</i>
Bicholim	<i>Cholera like vibrio</i>
Reis Magos	<i>Bacillus, not a vibrio</i>

As the outcome of the author's work he is convinced "that it is desirable that the terms 'cholérine' and 'choleraic diarrhoea' which, hitherto, to a certain extent are used to denote something which is (according to Kocir's rules) *not cholera*, should not, in future, be employed to describe any case possessing these two characteristics: (1) the syndrome of cholera, (2) infectiousness which would include, failing proof to the contrary, signs typical of the presence of the *vibrio of Koch*."

J H T W

ROGERS (Leonard) BAYLISS (W M) **Intravenous Injections of Gum Solutions in Cholera.** [Correspondence] *Brit Med J* 1919 Sept 20, Oct 4 p 394, p 450

In the *British Medical Journal* for June 7, 1919, pp 722-723, Professor BAYLISS suggested the addition of gum acacia to the hypertonic salt solutions used in the modern treatment of cholera [This *Bulletin*, Vol 14, p 183]. Sir Leonard Rogers records trial and failure of this method, and confesses that "The failure has been

a great disappointment to me, but I believe the explanation to be that the gum solutions lead to the retention in the circulation of the deadly cholera toxins."

Prof Bayliss writes

"With regard to the excretion of toxic substances through the kidneys, one of the most striking facts in my experiments was the restoration of the flow of urine by gum saline when it had stopped from various causes. It might perhaps be worth trying the effect in cholera of alternate injections of saline and of gum saline in order to increase the renal excretion and at the same time maintain the blood pressure."

J H T W

MOORE (Benjamin) **The Balance of Colloid and Crystalloid in Cholera, Shock, and Allied Conditions**—*Brit Med J* 1919 Oct 18 pp 490-492

As concerning colloids and crystalloids in metabolism normal or abnormal, Benjamin Moore writes with authority born of much investigation. Restricted space makes it necessary to abridge this article, but the essential paragraphs will be given in the author's own words. The "texts" are (1) "a review of a recent work by Richey, Brodin and Saint-Girons (*C R Acad Sci*, 1919, p. 9) on anaphylactic shock in which it is shown that such shock can be prevented by addition of sodium chloride to the dechanning dose of serum or by rendering the blood hypertonic with saline before the serum is injected"

(2) "a letter from Sir Leonard Rogers" see above

Now these two sets of observations [value of intravenous injections of hypertonic saline in cholera. Failure of added gum arabic which proved of great value in cases of surgical shock] are by no means contradictory but most beautifully complementary also both are in consonance with the findings of the French school on anaphylaxis and, as will be shown, with the earlier observations from India of Sutherland and McCay (*Biochem J* 1909, p. 1) that hypertonic salines inhibit haemolysis (rather in a natural haemolytic system or in actively created one with a specific haemolysin, as in the Bordet-Gengou reaction and the Wassermann test)

"The common cause of all these phenomena is a disturbance of that delicate equilibrium between the colloids of the blood and cells (such as proteins and lipoids) and the crystalloids (such as sodium chloride) existing united or dissolved in common solution or suspension."

Taking first, the positive effect of a colloid, such as blood proteins, gelatine, or gum acacia in shock due to hemorrhage, surgical injury or prolonged anaesthesia, as compared with the failure of simple hypertonic salines under these conditions, we find that the situation is one of a circulating fluid not merely defective in total volume but also relatively poor in colloid compared to crystalloid. Accordingly inorganic salts, or salines, given alone are here rapidly eliminated, having no colloid to anchor them, and so being treated as foreign bodies and thrown out by kidneys and intestine. But gum arabic, gelatine and plasma proteins cannot be so expelled, and serve to anchor inorganic salts and so preserve the equilibrium of crystalloid and colloid not only in blood but in the master cells of brain and heart, where the state of aggregation of the protoplasm would soon become altered."

The author then refers to experiments showing interaction by changes of osmotic pressure when the concentrations of salines, in which the colloid is in solution, is varied—*see Amer J of Physiol* 1902 and *Brochemical J*, 1906. The investigations referred to show

(1) "That a solution of gum arabic made in water or saline, as recommended by Bayliss, and injected intravenously will at once seize

upon or hold a certain amount of saline in the blood, and as a result of its presence the total salt content of the blood with which nerve and muscle cells stand in common equilibrium will rise, and (2), the most important fact, that as a result of this adsorption the state of aggregation of the injected gum will change so that the "molecular weight" or "solution aggregate" is only about one third to one fourth of its former value - for this is precisely what the fall in value of the osmotic pressure means on Avogadro's law

"Take next the case of efficiency of hypertonic salines in cholera, and inefficiency of colloidal solutions such as gums and it is clear that this is as it ought to be, for the condition is one of excess of toxic colloids and defect of balancing electrolytes or salines

"On the other hand free saline in the blood in such diseases as cholera combines with toxins to form a crystallo colloidal union, and this is an essential factor in excretion of the poison by intestine and kidney. The unattached colloidal molecule of toxin possesses no osmotic pressure, nothing to drive it through an excreting cell. When it becomes attached to a crystalloid the combination acquires a directive force like a granule within a porous pot and like this now possesses a power of diffusion."

The foregoing principles are next applied to the phenomena occurring in shock, the Bordet-Gengou reaction, the Wassermann test and in anaphylaxis, subjects not strictly relevant to this "Section." Then follow paragraphs of general interest, for an account of which space cannot here be found

J H T W

Roy (Ashutosh) Cholera Prophylactic Vaccination.--*Indian Med Gaz* 1919 June Vol 54 No 6 pp 209-214

The author states that "Vaccination against cholera had been proved to be so highly efficacious in the army and labour corps as to warrant its extensive use as a prophylactic measure amongst the civil population in India during an epidemic, or when it is likely to break out." Other opinions are quoted. In the recent European war the beneficial effect of prophylactic inoculation had been proved by Hoffmann in the German army and by Kaup in the Austro-Hungarian army" (*Ind J of Med Res*). The nature of the cholera bacillus is discussed, methods of conferring immunity are reviewed and a brief history of the "Development of Cholera Prophylactic Vaccination" is given [see this *Bulletin*, 1913 and following years]. Part II of Dr Roy's paper contains an account of experiments carried out in the Laboratory of the Central Research Institute Kasauli in 1916 and subsequently. *The New Cholera Vaccine of Kasauli* consists of "pure sterilized culture of cholera spirillum absolutely free from any reaction (local or general) and can be safely injected into people of both sexes, of all ages including infants and in all stages of health including pregnant and recently delivered women. The only two contra-indications are fever and diarrhoea." Vaccine is preferred by all recent workers to "cholera sera which are mainly bactericidal and little anti-toxic, for death in cholera is due to "disintegration of cholera vibrios and the production of a soluble, diffusible toxin." No beef is used in preparing the vaccine. It is not considered advisable to inoculate children under four years of age

DOSAGE ACCORDING TO AGE

	1st dose	2nd dose
4-6 years	0 15 cc	0 3 cc
6-8 "	0 2 "	0 4 "
8-10 "	0 25 "	0 5 "
10-12 "	0 3 "	0 6 "
12-14 "	0 4 "	0 8 "
14 and upwards	0 5 "	1 0 "
10 cc = 18 minims		

From February 25th to April 8th, 1919 (35 working days), 388 children and infants (under 4 years) and 3,250 adults were inoculated and this work is still going on. "From the point of efficiency combined with minimum reaction, the choice appeared to be in favour of carbolised vaccines."

J H T W

BERTARELLI (E) & MARCHELLI (M) [*Recherches sur la durée de l'activité des vaccins anticholériques et antityphoidiques*]—*Rev di Igiene e di Sanità pubblica* 1919 June 1 & 16 pp 121 & 133 [Summarized in *Bull Office Intern d'Hyg Publique* 1919 Sept Vol 11 No 9 pp 1004-1005]

It is recorded that the authors have made numerous experiments since 1917 with vaccines prepared by themselves or at the Serotherapeutic Institute in Milan. In the original papers the technique followed is given in detail with very complete tables. With anti-cholera vaccines (without distinction of source) the duration of active immunity is short, up to 3 months the diminution in agglutinogenic power is not noticeable, but decrease afterwards is fairly rapid.

J H T W

- 1 CANTACUZÈNE (I) & MARIE (A) Action activante de la muqueuse intestinale sur les propriétés pathogènes du Vibrion Cholérique.—*C R Soc Biol* 1919 July 19 Vol 82 No 23 pp 842-845
- 2 ——— & ——— Sur l'apparition précoce de sensibilisatrice spécifique dans l'intestin grêle des [cobayes] cholériques.—*Ibid* July 21 No 24 pp 981-984.

1 By whatever point the cholera vibrio enters the body it makes for the intestines and always finally reaches the walls of the small gut. There it pullulates. One is struck, at autopsies of acute cholera cases, by the fact that vibrios are often rare in the contents of the small intestines. Investigate the mucous membrane deprived of its epithelium there they pullulate and at the same time undergo a vibriolysis, the more intense as the toxic phenomena are more acute. It seems that the mucous membrane contains some substance which acts upon the cholera vibrio in such fashion that it increases both virulence and its power to produce toxin. The experiments described by the authors "show, in fact, that a small dose of extract of small intestine or of the caecum absolutely harmless by itself, added to a non-lethal dose of vibrios and inoculated into the peritoneum of a guinea-pig suffices to cause an acute and fatal choleraic intoxication." Examples of the experiments are given — 12 guinea-pigs

weighing between 250 and 350 grm., 10 guinea-pigs which received vibrios (from culture) plus extract of intestinal mucous membrane (guinea pig) died in 3 to 11 hours. The 2 controls which were inoculated with the same dose of the culture only showed no signs of illness. "At the autopsy is seen the classic picture of cholera." "It is found that this 'activating' property of intestinal mucous membrane is present in fresh intestines and also in the entrails of guinea-pigs 'vaccinated' against cholera," even more energetic in the extract from the gut of the 'vaccinated'."

The extract prepared from "vaccinated" animals was found to protect guinea-pigs against a mortal dose of vibrios if it was injected hypodermically 6 hours before the inoculation of the vibrios. The authors are not prepared to offer any interpretation of the facts.

The outcome of experiments on guinea-pigs is that certain reactions of immunity are present in the mucous membrane of the intestines before any such reaction is found in the blood. This result is perhaps not surprising since the conflict between the cholera toxin and the body tissues is more or less confined to the small gut. The vibrio rarely invades the body.

J H T W

SANARELLI (G) Patogenesi del colera (4a Nota preliminare) Il gastro-enterotropismo dei vibrioni [The Gastro-Enterotropism of (Injected) Cholera Vibrios]—*Ann d'Igiene* 1919 Mar 31 Vol 29 No 3 pp 129-131

— De la pathogénie du choléra Le gastro-entéro-tropisme des vibrions—*C R Acad Sciences* 1919 Mar 17 Vol 16 pp 578-580

The author finds that living cholera vibrios injected into the peritoneal cavity of guinea-pigs finally settle in the walls of the intestines. The guinea-pigs die from a very acute gastro-intestinal inflammation and at the autopsy the gut shows a picture like that found in human cholera.

J H T W

SANARELLI (G) Sur la vitesse de locomotion du vibron cholérique. — *Ann Inst Pasteur* 1919 Sept Vol 33 No 9 pp 569-574 With 1 fig

Professor G. Sanarelli is Director of "The Institute of Hygiene" in the University of Rome, and the memoir now reviewed forms his offering on the occasion of the Jubilee of E. METCHNIKOFF. "Watching motile germs, in a hanging-drop, with the ultra-microscope one is struck not only by the shape of the trajectory which differs according to the bacterial species, but, also by the difference, often notable, of the speed." Some move almost indolently, others with agility, there are even those which traverse the field of vision with such rapidity that they suggest the flight of an arrow from the bow. It is possible approximately to calculate the average speed of each species, if one takes care to follow, in the hanging-drop containing only a few germs, those individuals which, entering at a given moment the field of the microscope, pass across its diameter. The duration of the journey can be determined. Experiments made with different

strains of vibrios known in laboratories as vibrios of Hamburg, Constantinople, Saint-Petersburg, Rome, Marseilles, Isongo, Naples, Palermo, Massaouah, East Prussia, etc showed that most of them possessed much the same speed. The vibrio from Massaouah moved less rapidly than the others. The vibrios from Constantinople and East Prussia had lost all motility and possessed but little toxic power. By means of proportional triangles the author compares the speed of a vibrio with that of a locomotive engine. Compared with other motile microbes the author found that the speed of the cholera vibrio was —3 times greater than that of *B. prodigiosus*, 5 times greater than *B. typhosus*, 10 times greater than *B. coli* and 12 times greater than *B. megatherium*.

J H T W

VON EISLER (M) Ueber die Toxinbildung des Vibrio Kadi-Kjo in Nahrboden bekannter Zusammensetzung. [Toxin Formation in Nutrient Media of Known Composition]—*Cent f Bakt* 1 Abt Orig 1919 Aug 15 Vol 83 No 5 pp 353-369

The nutrient substances employed in these experiments were —
 (1) Chemical (a) Glycerine 8.0 cc, NaCl 1.2 gm, Calcium Chloride 0.02 gm, Magnesium Sulphate 0.08 gm, Potassium bi-phosphate 0.5 gm, Ammonium lactate 1.2 gm, Asparaginic [Aspartic] acid sodium salt 0.8 gm, Aqua dest 200.0 gm, (Uschinsky's medium)
 (b) The Uschinsky-Fraenkel medium (c) Uschinsky's fluid plus various amino-acids (2) Amino-acids singly and combined (3) Bouillon (4) Blood of rabbits by means of intravenous injections

The author arrives at the following conclusions —Of the combined chemical media the one used by USCHINSKY & FRAENKEL (Chloride of sodium 5.0 gm, Potassium bi-phosphate 2.0 gm, Asparaginate of sodium 4.0 gm, Ammonium lactate 6.0 gm, Aqua dest 1000.0 gm, made alkaline with 10.0 cc normal Na HO solution) is the one in which the Kadi-Kjo vibrio produces most haemotoxin. Table III shows the strength of the haemolysins formed in various media

TABLE III.

Culture Medium			Hæmolysins
Uschinsky Fraenkel	+	—	0.04 cc complete
"	"	+ 0.02 g Leucin	0.02 cc
"	"	+ 0.02 g + Leucin 0.02 g Leucin synth	0.04 cc
"	"	+ 0.02 g Leucin + 0.02 g Glykokoll	0.004 cc
"	"	+ 0.02 g Leucin + 0.005 g Tyrosin	0.01 cc
"	"	+ 0.02 g Leucin synth	
"	"	+ 0.02 g Glykokoll	0.04 cc almost complete
"	"	+ 0.02 g Leucin synth	
"	"	+ 0.005 g Tyrosin	0.06 cc complete
"	"	+ 0.02 g Glykokoll + 0.005 g Tyrosin	0.1 cc almost complete
"	"	0.02 g Leucin + 0.02 g Glykokoll + 0.005 g Tyrosin	0.005 cc. "
Bouillon			0.003 cc complete "

' Besides the haemolytic toxin acting upon red blood corpuscles *in vitro*, the culture grown of the Kadi Kjo vibrio in the nutrient fluids employed, as well as the Bouillon culture, possess, when injected into the veins of rabbits, a deadly toxic power in corresponding proportional strengths''

J H T W

VARIAN (Amos George) **Notes on Cholera Asiatica and its Early Treatment**—*Dublin Jl of Med Sci* 1919 Aug-Sept 3rd Series Nos 572-573 pp 66-74

The author leads off with a brief review of the history of cholera from early times. He then describes and discusses "Symptoms," "Reaction Period," "Treatment" and "Post choleraic uraemia." He calls attention to the valuable work done by "Leonard Rogers and his co-workers" and summarises the main principles of modern treatment —

"Replace the lost fluids and salts by hypertonic saline intravenous injections, of sufficient amount to raise the blood pressure to normal, if possible so as to ensure a rapid excretion by the kidneys" [of this *Bulletin*, MOORE]

' Stimulate the heart and vital internal secretions

The great majority of cases, come under observation in the acute periods, and are usually collapsed to a greater or less degree, and the great problem is to restore the circulation, revive the blood pressure and lower the specific gravity. Drugs to be useful must be given hypodermically, as no absorption can take place in the intestinal tract"

Describing his own methods the author writes — "Saline enemata may be used in the reaction period when diarrhoea has ceased, or become intermittent. In our experience they were practically useless and were rarely retained." "Subcutaneous saline injections may tide over the chances of collapse"

For intravenous injections the following solution was used —

Sodium chloride	120 grams
Calcium "	4 "
Potassium ,	6 "
Water to	1 pint

The blood pressure was estimated by means of a Riva Rocci pattern sphygmometer. The specific gravity of the blood was taken by means of the drop method, in known stock solutions. "A blood pressure of 70 mm is the danger line of collapse and an indication for immediate injection" bring this over 105 mm and the specific gravity as near normal as possible

Specific gravity	1032	requires	no injections
" "	1066	"	4 pints
" "	above	"	6 "

The saline is injected at body temperature in collapse, if there is hyperpyrexia at a temperature as many degrees below normal as the patient's temperature is above it. As to the treatment of uraemia and anuria "the decline in the mortality in the reaction phase is greatly due to the introduction of intravenous sodium bicarbonate injections, which have lowered the post-choleraic uraemia mortality by 70 per cent" Alkaline solution of the following strength was employed —

Sodium chloride	60 grams
" bicarbonate	160 "
Water to	1 pint

Anti-cholera vaccines were not used by the author and his colleagues in the active treatment of the disease and he agrees that definite statistics have not yet been published as to the prophylactic treatment with anti-cholera vaccine, but there is reason to believe that great benefit has been obtained from their use.

T H I W

REVIEWS

MASTERMAN (E. W. G.) [M.D., F.R.C.S., D.P.H., Medical Superintendent Camberwell Infirmary] **Hygiene and Disease in Palestine in Modern and in Biblical Times** With Two Appendices (With a Preface by Alexander MACALISTER, M.D., F.R.S., Professor of Anatomy, University of Cambridge)--xv + 69 pp. With 5 plates. 1919. London. Palestine Exploration Fund, 2, Ilindie Street, Manchester Square, W. 1 [Price 2s 6d]

To the author of this little book we owe much of our information of the diseases of Palestine as reader of this *Bulletin* are aware. The late Professor MACALISTER, who writes its preface, describes it as a well timed and most interesting contribution to our knowledge. With the enactment and enforcement of modern hygienic regulations Palestine might become, he writes, one of the healthiest countries in the Eastern Mediterranean area, but readers of the book will think that there is much superstition and "use and wont" to overcome by education before hygienic regulation can become effective. The book is divided into three sections, the first on the diseases of modern Palestine and Syria, the second on the diseases of the Bible, which do not fall within the province of this *Bulletin*, and the third on the water supply of Jerusalem from the Romans and earlier, to ADILNBY. In pointing to the influence on disease of race and habit the author tells us that the habits of the nomads or bedawin, the peasants or fellahin, and the town dwellers or hader differ greatly. The bedawin should enjoy the best of health but they suffer from malaria and even from tuberculosis and their mortality is very high, their goat hair tents abound in lice, mosquitoes and other insect pests. In Northern Palestine lice are so rarely absent that a common exclamation is—"May God not remove them from me," because the sudden departure of these pests is considered a sign of mortal sickness.

The author reminds us that Palestine belongs to the sub-tropical zone—the latitude of Jaffa is that of Amritsar or Shanghai—while the Jordan valley is truly tropical. All the rain falls in six months and springs in the highlands are few, so that from the earliest times the water for domestic use and for the vineyards has been run water stored in cisterns. In Jerusalem the total storage capacity was estimated by the British engineers, after the occupation of the city as 560 000 000 gallons. Dr. Masterman points out that well stored cistern water keeps sweet and good for a long time but it is liable to contamination and, since the cisterns are usually open, mosquitoes including *Anopheles* breed in them in countless numbers. As to the climate "the clear pure air and cloudless sunshine are very enjoyable. Compared with Egypt the highlands of Palestine enjoy a better summer climate for Europeans." For dwellers in the Maritime Plain visits to the highlands for part of each year would be desirable, and most of the Jordan valley is quite unfit for European families.

The chapter on the common diseases of the country contains much that might be extracted from the back pages of this *Bulletin*. Readers may be reminded that in Jerusalem in the autumn no less than 27 per cent of the children attending school harbour malarial parasites. Five species of *Anophelines* are mentioned, but readers who desire an authoritative statement will refer to Major E. E. AUSTEN, who recognised eight species in Southern Palestine alone (*Trans Soc Trop Med & Hyg* 1919 Vol 13 No 4). Examination by Dr. Masterman of all the patients who came to his hospital for one year showed that 46 per cent were infected and of these one fourth with benign tertian, one fourth with quartan and the rest with sub-tertian parasites. The loss of infant life through malaria is described as terrible. The occurrence of blackwater fever is almost exclusively among Europeans. It is interesting to hear that "scarlet fever appears to have been recently introduced and its toll of victims in the towns has been enormous." After malaria the disease which is responsible for most deaths is tuberculosis—of the lungs, bowels,

bones and joints, and lymphatic glands, and we are told that the increase during the last few years has been appalling. It is attributed partly to the larger number of cases which have been sent from other lands to the pure air of Syria. Only one sanatorium is in existence. Leprosy is not common, as the author clearly indicates, the biblical *zavarath* is not leprosy. Diabetes seems to be peculiarly common, chiefly among the Armenians. Perhaps, as in India, it is a disease of the wealthier classes. Ophthalmia is very prevalent, it is partly muco purulent conjunctivitis and partly trachoma, for which the Semitic races are said to have a special proclivity. In many districts, writes the author, it is the exception to find a person with two really sound eyes.

An interesting account is given of the ideas among the natives regarding the causes and cure of disease.

The Section on diseases of the Bible contains much that is of interest, though a great deal is conjectural. In the Old Testament disease in the individual is hardly mentioned, it is disease as the punishment of a community which is described, and that in the vaguest terms. The author agrees with most writers that the epidemic of "emerods" associated with "mice," mentioned in Samuel, was bubonic plague.

The illustrations consist chiefly of photographs of the Mission Hospitals.

A G B

DOBELL (Clifford) [M A, F R S, Assistant Professor of Protistology and Cytology in the Department of Biology, Imperial College of Science and Technology London late Fellow of Trinity College, Cambridge] **The Amoebae living in Man. A Zoological Monograph**—vii + 155 pp. With 5 plates. 1919. London. Published for the Medical Research Committee by John Bale, Sons & Danielsson, Ltd. [Price 7s 6d net.]

Protozoologists and medical men, especially those who work on intestinal amoebae, will welcome this account of the amoebae living in man, which embodies the results of Prof. Dobell's extensive experience of these organisms. The author has also made an exhaustive study of the literature of the subject and out of the fulness of his experience has been able to examine critically the numerous conflicting statements which have added so many difficulties to the study of the amoebae of man, and to show clearly which may be discarded as erroneous or improbable. Prof. Dobell's criticisms on the work of his predecessors, while for the most part justifiable, are perhaps here and there rather severe.

In a short note on material and methods the author lays stress on the impossibility of obtaining a correct knowledge of the amoebae in man without examining an abundance of living material. Some of the mistakes made in the past have been due to the study of dead or degenerate amoebae, often also inadequate in quantity.

In the chapter on the present state of our knowledge of the amoebae living in man the author points out that by the year 1897 all the main facts necessary for understanding the relation of amoebae to dysentery had been discovered but confusion afterwards arose for which Prof. Dobell rightly regards SCHAUDINN as having been chiefly responsible. Recovery from this relapse was only brought about ten years later, largely through the brilliant work of WALKER (in the later part of which SELLARDS collaborated), and the confirmation and extension of his results by DARLING, WENYON, W. M. JAMES and others.

In the following chapter Prof. Dobell discusses, from the zoological standpoint, the genera of amoebae living in man and their nomenclature, and urges that any drastic change in the nomenclature of the dysentery amoebae, such as has been suggested by some writers, should be avoided because it would lead to most serious confusion. "What, for example, should we gain by calling the dysentery amoeba, which every worker in England has known for years as *Entamoeba histolytica*, by the new name *Pomeramoeba coli*?"

The genera and species of amoeba living in man are given as follows — *Entamoeba coli*, *histolytica* and *gingivalis*, *Endolimax nana* *Iodamoeba* (new genus) *butschlii*, and *Dientamoeba fragilis*, and in the following chapters each of these is the subject of a systematic account—synonymy, history, characters, reproduction, habitat, dissemination and pathogenic effects (if any)

The account of *Entamoeba histolytica* (50 pp) is especially complete and detailed. This species does not force its way through the tissues by means of tough pseudopodia but, in all probability, secretes a powerful cytolytic ferment which first dissolves the cells. Prof Dobell states that good sections show clearly that the amoebae apply themselves to the tissues which then break down and the organisms thus come to lie in a pool of histolysed tissue from which they evidently absorb nutriment. Such material probably forms the chief food of *E. histolytica* but in acute amoebic dysentery a large proportion of these amoebae may contain red blood corpuscles.

Prof Dobell does "not believe that more than 10 per cent of persons who become infected with *E. histolytica* ever suffer to any appreciable extent from their infections," and thinks it "very probable that even this is much too high an estimate." The whole argument that the "normal" or most usual condition of the infected individual is that of a "carrier" is very cogent.

The great diversity in size—from about 5μ to 20μ in diameter of the cysts belonging to different strains or races of *E. histolytica* is emphasised, but apart from their size the cysts present no other differences. As the cysts of *coli* range in diameter from about 10μ to 30μ , the size of the cyst is of use in specific diagnosis only when very large cysts of *coli* or very small cysts of *histolytica* are concerned.

Prof Dobell draws careful attention to the position of the karyosome in the vegetative and cyst nuclei—typically central in *histolytica* and excentric in *coli*—a specific character which is especially helpful in well fixed, stained specimens. Further, in *coli* the cysts show either two or eight nuclei, the quadrinucleate stage being very transient and rarely seen. In *histolytica* the quadrinucleate phase is diagnostic for although probably supernucleate cysts, *eg*, with eight nuclei, are occasionally formed, this is so rare that for all practical purposes their occurrence can be ignored. It is pointed out that the presence of chromatoid bodies is not a means of distinguishing *histolytica* from *coli*, for these bodies may occur in both species.

The author discusses the question as to whether there are races of *histolytica* which differ in their pathogenicity, and concludes that it is the susceptibility or the resistance of the host, and not a difference in the virulence of the strain, which determines whether any given infected individual does or does not suffer from amoebic dysentery.

To the question "Can *E. histolytica* live as a commensal?" the author answers that on *a priori* grounds this is highly improbable. He regards the occurrence of bacteria in these amoebae as almost invariably a sign that the latter are degenerating and have been invaded by bacteria.

In the chapter on *E. coli*, Prof Dobell remarks that red blood corpuscles and tissue cells appear to be about the only things which this species will not eat. The pre-cystic phases of *coli* are so closely similar to those of *histolytica* that it is frequently impossible to distinguish them with certainty, and the only safe course—as the author points out—is to examine further samples of the stools until either ordinary vegetative forms or cysts are passed.

The account of *E. gingivalis* is a summary of the present state of our knowledge of this species. Prof Dobell, in agreement with most recent workers, regards *gingivalis* as non pathogenic.

The peculiar karyosome of *Endolimax nana*, the cysts and the other known features of this species are clearly described. This organism, which lives in the contents of the intestine—probably the small intestine, proves to be one of the commonest inhabitants of the human gut though, it escaped definite recognition until very recently.

Prof Dobell has formed a new genus—*Iodamoeba*—for the amoebae whose cysts have become well known during the last four years as ‘iodine cysts’ or ‘*I* cysts,’ from their large mass of glycogen which in iodine solution becomes mahogany coloured. This amoeba also lives upon the intestinal contents and is widely distributed.

The chapter on *Dientamoeba fragilis* contains a summary of the recent account of this genus and species by MISS TRIPP and Prof Dobell (1918).

The author discusses the cases in which amoebae have been found in the urine of man, in regard to most of which the details are incomplete. The most satisfactory case—that of WARREN (1915)—is regarded as a true example of secondary infection of some part of the urinary system with *E. histolytica*, and probably some of the others are capable of similar explanation.

Prof Dobell’s consideration of the cases of spontaneous amoebic dysentery and liver abscess in dogs observed by KAPTUTIS DARLINC and WARE leads him to the conclusion that these were all due to infection with *E. histolytica*.

Two species of *Entamoeba* recorded from monkeys are briefly discussed. *E. pitheci* which is non pathogenic and is not indistinguishable from *colae* and *E. nuttalli* at present indistinguishable from *histolytica*. The status and relations of these species can only be determined after further observations.

A final chapter is devoted to notes on certain imperfectly described amoeboid organisms from man, e.g., *Leydenia*, *Entamoeba undulans* (probably a degenerating *Trichomonas*), *Claudia*, etc., all of which are critically reviewed.

There is an extensive bibliography, a serviceable index, and 94 excellent figures on five plates, two of which are printed in colour.

Prof Dobell’s revision of the species of amoebae living in man has resulted in a thoroughly lucid and practical account of what is definitely known and proved about each species and his book should be consulted by all who have occasion to work at these organisms.

J H Ashworth

HIRST (Stanley) [British Museum (Natural History)] **Studies on Acari No 1 The Genus Demodex, Owen**—44 pp With 13 plates and 4 text-figs 1919 London Printed by Order of the Trustees of the British Museum [Price 10s]

The *Demodicidae* are minute, degenerate vermiform mites that live in the cutaneous glands and follicles of many mammals. The author of this fine memoir reminds us that the type species, *Demodex folliculorum*, though in the opinion of one recent authority it occurs in ‘practically every human being’ was first noticed only in 1841 by HENRI, was first described under the name *Acanus folliculorum* only in 1842 by SIMON, and received its generic appellation *Demodex* from the renowned OWEN in 1843.

The species of *Demodex* give rise to mange or to pustular eruptions in most of the cosmopolitan domestic animals, but though the one that infests man is generally regarded as a quite innocent inhabitant of the sebaceous glands, the author mentions the different skin affection—eczematous, impetiginous, proliferating, and pigmentary—which have been assigned to its activity by different authors, its supposed association with the transmission of leprosy, and its half suggested connexion with certain forms of cancer.

In the very clear account of the morphology of the *Demodicidae* attention is drawn particularly to a dorsal tubercle or spine on the proximal segment of the palpi as a good character for discriminating the several species, and also to the distinctive features of the sexes. In the male the sexual opening is dorsal in position and stands near the level of the interval between the first and second legs, and there is a conspicuous penis, in the female the sexual orifice is ventral and lies just behind the last pair of legs.

As regards the affinities of the group, the author approves and develops the theory of retrogressive descent from the *Cheletridae*, instancing as common features the form and dorsal position of the penis, the structure of the mouth parts, and the absence of the anus.

In the purely descriptive part of the memoir it appears that 19 species of *Demodex* are known to exist, of which 16 have been described. Of these 16 species the author gives a sufficient account of fifteen, with 13 of which, along with certain appurtenant varieties, he is familiar by autopsy. Four species and four varieties were discovered by the author himself, of which one species and one variety are here characterised for the first time. As the species are very clearly figured their identification, which hitherto has been difficult, should now be easy.

The author is to be congratulated on a monograph of singular excellence and completeness. Unfortunately the bibliography—which he tells us includes more than 230 papers—has been omitted for financial reasons. Perhaps the authorities hesitated to incur the risk of some modern adaptation to this subject of the reproachful words of Ulysses:

‘Nature, what things there are
Most abject in regard but *dear* in use!’

A. Alcock

**ROCKFELLER FOUNDATION International Health Board Fifth
Annual Report January 1, 1918–December 31, 1918 179 pp
With 52 figs. 1919 New York 61, Broadway, N.Y., U.S.A.**

The fifth annual report of the International Health Board by the General Director Mr. Wickliffe ROSE, consists of a General Summary occupying 23 pages and an Appendix containing detailed information, of some 150 pages.

It is noticed that hookworm control demonstrations almost everywhere are being followed by a desire on the part of the people for better public health administration and that this desire manifested itself by increased appropriations by health departments.

A study of yellow fever and related infections was made at Guayaquil between August and the end of the year. As is generally known Dr. Hideyo Noguchi succeeded in isolating an organism *Leptospira uteroides*, which is the apparent cause of yellow fever. An epidemic of yellow fever appeared in Guayaquil in June 1918, and the Board tendered its services to the President of the Republic. Senior Surgeon Joseph H. WHITE was detailed for the work. It was ascertained that the disease had been introduced from southwestern Mexico and had spread to 17 communities near the west coast. There had been 550 cases with 200 deaths. Surgeon WHITE carried through all the usual preventive measures, by September 19 the disease was under control and after December 2 no further cases occurred. It is regarded as demonstrated that yellow fever can be controlled with the personnel and facilities available in Central American countries and at a cost well within their financial ability. An effort is being made to free Ecuador from the disease and Dr. M. E. CONNOR has been sent to Guayaquil for that purpose. The work is now in progress.

The developments in hook worm control will be considered elsewhere but one notes with special approval that communities desiring the Board's participation in efforts to control hookworm were advised that "assistance could not be rendered unless latrines or other proper methods for disposing of human excrement were installed and in use in advance of treatment being undertaken." This meets a criticism of the Board's methods which has been made in several quarters.

Demonstrations in malaria control have been continued and are described in the appendix.

A spot map shows the nature of the Board's activities in various parts of the world and the report is illustrated in a way that is at once attractive and informing.

A. G. B.

**La Faculté de Médecine de l'Université de Paris Organisation générale
enseignement, examens, diplomes, programmes et horaires
pour l'Année Scolaire 1919-1920 84 pp 21 plates
1919 Paris Masson et Cie [Price 1fr net]**

Dr H ROGER, Dean of the Faculty of Medicine of the University of Paris, forwards this illustrated brochure, which gives all the information likely to be required by anyone wishing to pursue his studies during the year 1919-20 at the University, where the Faculty of Medicine has now been completely re organised. A table of statistics shows that from 1911 to 1914 the foreign students averaged 800, and even during the war there were more than 700 per year. The details of the instruction given by the *Institut de Médecine Coloniale* (p 59) will interest more especially readers of this *Bulletin*. It comprises lectures and practical work on bacteriology and haematology (M ROGER), bacteriological diagnosis, exotic pathology, colonial hygiene (M WURTZ), parasitology (M BRUMPT), epidemiology (M L BERNARD), dermatology (M JEANSELME), surgery of warm countries (M LECHE), eye diseases (M DE LAPERSONNE), and clinical instruction at the *Hopital des Dames Françaises*. The fees to be paid on entry amount to 280 francs. The course lasts 10-11 weeks. Examinations are held at the end of the course and the successful candidates receive the diploma of *Medecin colonial de l'Université de Paris*. Enquiries should be addressed to Secrétaire général, 15, rue de l'Ecole de Médecine, Paris.

A G B

THOMSON (Sir St Clair) [M.D., F.R.C.P., Lond., F.R.C.S. Eng.] John Coakley Lettsom and the Foundation of the Medical Society being the Presidential Address delivered before the Medical Society of London on October 8th, 1917 63 pp 16 figs 1918 London Harrison & Sons, St Martin's Lane, W.C. [Price 2s 6d]

John Coakley Lettsom was born in 1744 in the West Indies and died in 1815. In his 15th year he was apprenticed to a surgeon in Yorkshire. When he was 20 he came to London. Two years later he visited the West Indies, freed 50 slaves which he had inherited and started practice in the Island of Tortola, one of the Virgin Islands, where he made £2,000 in 5 months. He then returned to London where in a few years he was making a large income from his practice. In this address details are given of his life and of his writings, which were not numerous, of his contemporaries and the founding of the Medical Society of London. It is attractively written and well illustrated.

A G B

BASU (B. D.) [Major, I.M.S. (ret'd)] Diabetes and its Dietetic Treatment Tenth Edition (Revised and brought up to date) ii + 89 pp 1919 Bahadurganj, Allahabad The Panini Office, Bhuvaneshvari Ashram [Price Re 1-8]

This is a new edition of a book which was reviewed recently [see this *Bulletin*, Vol 13 p 385]. It is shrunken a little owing to the omission of some of the foot notes. The author contributes a new preface wherein he gives his views as to the cause and nature of diabetes. It is in most cases he thinks, "brought on by alimentary toxæmia," and is in other cases "a deficiency disease."

A G B

TROPICAL DISEASES BUREAU.

TROPICAL DISEASES BULLETIN.

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MALARIA

DUDGEON (Leonard S) & CLARKE (Cecil) **An Investigation on Fatal Cases of Pernicious Malaria caused by *Plasmodium falciparum* in Macedonia**—*Quarterly Jl of Med* 1919 July Vol 12 No 48 pp 372-390 With 1 plate

During the season of 1917 material was collected with the object of correlating as far as possible the clinical history of Macedonian cases of malaria with the microscopical examinations. It was noted that a high percentage infection of the red cells may be compatible with a mild attack of malaria yielding readily to treatment. The converse is also true, i.e., few parasites in the peripheral blood but a severe and even fatal type of fever. The points to which special attention are directed in this paper are—

- 1 Fatty degeneration of the heart muscle
- 2 Haemorrhages into the lung alveoli
- 3 The rôle of the suprarenals in death from pernicious malaria

[The classification of cases adopted is somewhat confusing and rather difficult to follow and it is advisable to consider in the first instance what is said regarding the three points above mentioned.]

1 The authors have already described the heart condition [see this *Bulletin*, Vol 11, p 31]. It exactly resembles what is found in acute diphtheritic toxæmia. Two factors which must not be forgotten as playing a part in its etiology are the long period of hot weather to which the men were unaccustomed and the lack of rest, the result of military circumstances. Cases illustrating the association of this fatty degeneration with acute cardiac failure are described. In addition to the fatty degeneration, the severe general toxæmia present in pernicious malaria must cause disturbance of the heart's action while the cardiac capillaries may be blocked by numerous

malarial parasites. A coloured plate shows a section of cardiac muscle exhibiting an extreme degree of fatty change.

2 Haemorrhages into the lung alveoli are usually quite limited in character and most often confined to the lower lobe or posterior portions of the lungs. They suggested small areas of collapse, hypostatic congestion or broncho-pneumonia, but never infarction. Physical signs of consolidation could apparently only exceptionally have been detected during life. The microscopical findings are described as follows —

“Haemorrhage into the lumina of the bronchi, considerable dilation of the capillaries in the alveolar walls, diapedesis of red cells and loci of alveoli filled with red blood cells. There was complete absence of cellular reaction, but detached mononuclear cells filled with golden brown pigment were conspicuous. Phagocytosis of red cells occurred, but was not a marked feature. Patches of oedema and collapse were in close proximity to the haemorrhagic areas.”

These haemorrhages are due to congestion of the alveolar walls and accompanying tissue changes and are analogous to what is met with in the brain and spleen. An account is given of two cases in which post-mortem these haemorrhages were found. In the first moist sounds were first of all heard all over the chest and later consolidation at the right base was diagnosed. The second was really an example of a haemorrhagic type of pernicious malaria.

3 Special attention was paid to the adrenals because PAVSLEY and LEMAIRE regard acute suprarenal insufficiency as a determining cause of death in pernicious malaria. Thirty-five cases were examined by Dudgeon and Clarke. They found the most constant lesion to be a reduction of the fatty lipoids of the cortical layers, a change appreciable to the naked eye. The chromaffin content, as estimated by chromic acid fixation, was diminished. In only five other cases were important histological changes, such as thrombosis of capillaries, haemorrhages and degenerative changes in the cortex, observed. The clinical aspects of the five cases are briefly described —

Case I Stuporous, continued high remittent fever, anaemia, diarrhoea, no vomiting, pulse regular. Died three days later in coma.

Case II Sudden collapse and unconsciousness, anaemia, pulse constant hiccough. Died the same day.

Case III Found unconscious. Died soon after.

Case IV Admitted in deep coma, pulse 150. Died soon after.

Case V Jaundice, rapid weak pulse, subnormal temperature, restless. Cardiac dilatation. Chronic interstitial nephritis. Died about thirty hours after the collapse commenced.”

The authors would not attribute death in these cases solely to a disturbance of adrenal function. Other viscera, and especially the brain, were similarly affected and the changes may be regarded as evidence of the extensive nature of the lesions in pernicious malaria. The symptoms alone do not suggest suprarenal insufficiency. The question is of importance in treatment, for experience has shown that adrenalin produces no permanent beneficial effects, thus bearing out the views above expressed.

The findings in cerebral and comatose cases are fully described, and, following EWING, are relegated to three types, the first due to massing of young amoeboid parasites in the cerebral capillaries, the second to embolic processes, and the third to general toxæmia.

EWING's type I, where the coma comes on rather slowly and where many young parasites are found in the finger blood, was clearly recognised in 21 cases. Clinically Dudgeon and Clarke recognize the second type in which the coma develops suddenly and may be transient. It may, however, be much more prolonged and serious, but is seldom fatal. They give an account of one fatal case but are not prepared to subscribe to EWING's view of the pathology of the condition.

Two groups of seven cases are cited as examples of type 3 in which, according to EWING, "the coma develops slowly, but may in cachectic cases be ushered in suddenly, apparently by some embolic process. It is often of prolonged duration, and not being caused by massing of young parasites in cerebral vessels it is unaffected by quinine. Occurring only in severe cases, and being associated with serious toxic lesions in many viscera it is nearly always fatal. The parasites are usually scanty in the peripheral blood, and at the time of death are absent or scanty in the tissues."

In some cases the authors found scattered haemorrhages in the cerebral tissues. The changes found in the kidney, intestine, spleen and liver are duly recorded but need not be mentioned in this review.

As regards melanin the authors again note that the free iron reaction in the tissues in acute malaria is insignificant while in chronic malaria with anaemia it may be intense. They obtained no evidence of any intracellular form of the malarial parasite.

A Balfour.

MAYNE (BUCE) The Ultimate Seasonal Infection of Malarial Fever, with the Mosquito Carrier as the Indicator — *Public Health Rep* 1919 Aug 29 Vol 34 No 25 pp. 1929-1973

This communication deals with a question previously raised by the author in his paper "Anopheles as a Winter Carrier of Plasmodium" in *Public Health Reports*, Vol 30, No 29, 1915 (M. BRUN MITZMAIN) in which he states —

"It seems quite feasible to establish for any endemic focus what may be termed the malarial indicator. This is the determination of the time of the year when mosquitoes first acquire malarial infection. Thus, a fairly stable indicator may be obtained of the time when there is danger of the communicability of malaria from man to man. It might be entirely feasible to utilize the mosquito indicator to determine when active means of prophylaxis should be inaugurated in any locality, and, if necessary, likewise to determine at the end of the season when prophylaxis may be safely dispensed with."

He now finds that the date of terminal infection of mosquitoes collected in northern Louisiana during 1917 was November 1st. It is pointed out that this finding only holds good for the actual district and year in which the investigations were carried out, other districts have different climatic conditions and local circumstances affecting the issue. Furthermore, for accuracy, repeated investigations year after year are necessary in the same locality. As regards the time when it is safe to curtail sanitary control he calculates as follows assuming that November 1st was the date determined as that of

ultimate mosquito infectibility, and allowing 18 days for complete metamorphosis of the insects and 12 days for the adult mosquito to become infective, it follows that 30 days may be counted back from the date of ultimate infection of the mosquito. Thus the date to be chosen for the safe discontinuance of operations against the mosquito *in the district and for the years under investigation* becomes October 1st

A B

CARTER (H R) **The Malaria Problem of the South** — *Public Health Rep* 1919 Aug 22 Vol 34 No 34 pp 1927-1937

In this paper the author draws attention to the gravity of malaria from the point of view of sickness and loss of work. He gives comparative statements: one death from pneumonia corresponds to 125 sick days lost, one from typhoid or tuberculosis to 450 or 500, but a death from malaria corresponds to from 2,000 to 4,000 sick days. A man sick with malaria is not infrequently sick all the time. The loss of efficiency caused by malaria in the malarious section of the Southern States is beyond comparison greater than that caused by any other disease or even by two or three other diseases combined. He points out that sufficient attention to rural malaria has not been given in the past, amongst other reasons being that the most progressive local health officers are those in cities. Urban malaria is a matter not calling for much attention and consequently the sanitary leaders have failed to impress the rural populace and medical men with the need for anti-malarial measures in country districts.

The author then proceeds to mention the methods of conveyance of the disease and the means of control and gives examples of rural districts which have taken up anti-malarial work.

At Roanoke Rapids, N C there is a population of about 4,000 and prior to the anti-malarial work mill-owners estimated the efficiency rate at 40 per cent to 60 per cent during the four unhealthy months. Anti-malarial work commenced in 1914 and that year the efficiency rate was 90 per cent to 95 per cent of the normal and in 1915 no loss of efficiency during the unhealthy months was observed. Visits of doctors on account of malaria dropped from an average of 50 per day prior to anti-malarial work to one call in 3 days in 1915. The control of mosquitoes was the method employed and Carter points out that the expense per head for this work increases and decreases inversely as the population per unit of area.

Similar results are quoted for Wilson, Va., another rural district. In Crystal City, Mo., with a population of 8,000, malaria has been reduced by from 80 to 90 per cent. In all the above, control of breeding places was alone employed, and the author states that screening of houses, where control of breeding places has been impossible, has yielded good results, but not so good as those obtained by the latter. Bass's method of reducing the malarial incidence by quinine immunization of the population is mentioned but the author was unable to furnish details though he believed it had proved successful [see this *Bulletin* Vol 14, p 294]

A. B.

ARMAND-DELILLE (P) *Considérations relatives à la conception uniciste des Hématozoaires des fièvres tierces bénigne et maligne* —
C R Acad Sciences 1919 Feb 21 Vol 168 No 8 pp
 419-421

Reference is made to a former note [see this *Bulletin*, Vol 11, p 11] wherein the author, dealing with malaria in Macedonia, pointed out that in 1916 from August to October *P falciparum* was almost the only form of malarial parasite present in the blood while at the beginning and the end of the epidemic *P vivax* alone was found. The latter is also the parasite which after some time persists in the blood of malarics invalided to France although originally they were infected with malignant malaria. The same fact, so far as Macedonia is concerned, was observed by TEISSONNIÈRE during the aestivo autumnal seasons of 1917-18.

This alternation of parasites in the same individual is stated to be an argument in favour of the view long held by LAVERAN that there is only one species of malarial plasmodium. Armand-Delille now advances certain hypotheses based on these observations, which appear to support LAVERAN'S belief.

He thinks this alternation of parasites is to be explained in terms of the infecting anophelines. In other words, *P vivax* alone is present at the beginning of epidemics while *P falciparum* appears in the blood during the period when reinoculations occur and starting from the moment when the sporozoites are introduced in an almost continuous manner into the blood, the schizonts are very small and the gametocytes assume the form of crescents, well known for their resistant powers. Further, the supposition is advanced that this aspect and these forms of resistance are the result of a modification of the blood serum, the repeated inoculations of sporozoites favouring the production of anti-bodies which determine the production of resistant forms of the parasite.

The existence of anti-bodies is not pure conjecture, for ABRAMI has shown the schizontolytic properties of the serum at certain periods of malarial infection and the author has also found that certain sera of malarics give a deviation of complement in presence of parasites isolated by haemolysis and centrifugation from a blood heavily charged with parasites during a pernicious access.

When anophelines disappear during the winter months or the patient being in a healthy country, is no longer exposed to infection from their bites, anti-bodies cease to be produced or are gradually eliminated and the formation of crescents terminates. Instead the parasite perpetuates itself by schizogony and produces large spherical gametocytes capable of surviving over a long period, *i.e.*, until the intermediate hosts again start breeding out.

The author considers this interpretation further supported by the fact that the gametocyte of *P vivax* can undoubtedly undergo a regressive schizogony [this view is by no means generally accepted] while this has never been definitely proved in the case of crescents. He would explain the rare occurrence of small rosettes in the case of malignant infection as being perhaps evidence of abortive forms of schizogony induced by the action of anti-bodies. He considers his hypothesis explains the facts observed in Macedonia, where a large

number of healthy men was introduced into a region of endemic malaria but where, on account of a cold winter, anophelines vanish during several months of the year

A B

EISNER (Georg) **Zur Erklärung der Tertianaanfälle nach Tropikalinfektion Gegen die Annahme der Einheitlichkeit der Malaria-parasiten** [The Explanation of Benign Tertian Cases following Infection with Tropical Malaria Controversy of the Unitarian Theory]—*Beil Klin Woch* 1919 April 28 Vol 56 No 17 pp 394-395

After several years' experience of malaria in Macedonia Eisner rejects the theory that there is only one species of malarial parasite, a view advanced by LAVERAN and, amongst German authors, supported by PLEHN

He argues that cases of benign tertian infection occurring in persons who in the previous summer had suffered only from tropical malaria are readily explained when it is remembered that the former frequently remain latent for long periods. Quinine prophylaxis is able to keep benign tertian malaria in subjection but often fails to suppress infection with *P. falciparum*. Hence in cases of double infection the latter is at first in evidence while the former only appears at a later date.

Again, in Macedonia infection with tropical malaria was acquired late in the summer at a time when quinine prophylaxis had become slack and irregular so that *P. falciparum* had a better chance of establishing itself than *P. vivax*, infection with which occurred earlier at a time when the prophylaxis was properly carried out.

The author advances the hypothesis that a tropical infection may actually prevent the development of a benign tertian infection, but brings forward no argument in support of the suggestion. The apparent change of type seen in the initial attack may also be observed in the relapses. Here processes of immunity may play a part but, whatever the cause, the majority of benign tertian relapses occur in the spring, i.e., from March to May, while the tropical relapses, after appearing first in the autumn or throughout the winter, again show themselves in the beginning of the summer. Hence it is easy to understand that the later benign tertian relapses of the early summer may in the same patient be followed by recurrences of tropical malaria.

There are, however, other facts which disprove the unitarian theory, as, for example, the morphological and histological differences in the parasites, the differences in the types of fever they produce and numerous specific epidemiological and clinical features which distinguish benign tertian from tropical malaria. Eisner discusses these in some detail.

A B

FERMI (Claudio) **Erronei giudizi, equivoci ed assurde pretese riguardanti il metodo antianofelico-malarico** [Mistakes and Absurd Suppositions concerning the Anti-Anopheline Method of Combating Malaria]—*Malariaologia* 1918 Aug 31 Ser 2 Vol 4 No 3-4 pp 49-91.

It would appear that there are still in Italy some who deny or misunderstand the importance of the part played by the anophelines in

the causation of malaria and who adopt an obstructive attitude against the adoption of measures aiming at the clearing of malarial districts of anophelines. The author opens his paper with a list of current objections and misconceptions and then proceeds to deal with them *seriatim* and in detail. He points out, *inter alia*, that soil drainage, of the greatest value if combined with an intensive campaign against the anopheles in minor anopheligenous foci, is inefficacious by itself. On the other hand he maintains, as the result of experience of anti-anopheline campaigns in the Agro Romano, Puglie Palo, Ladispoli, Grosseto &c, that, by means of thorough and well planned anti-anopheline measures, not only minor foci but also streams, swamps lagoons, &c, may be successfully dealt with.

F S Arnold

MAUREL (Pierre) **Hydrologie pratique Les anémies et en particulier l'anémie palustre aux eaux minérales** — *Progres Méd* 1919 Aug 2 No 31 pp 305-306

The first portion of this paper deals with various classes of anaemias not of malarial origin. As regards these the author points out that residence at certain altitudes combined with arsenic has given the best results. Patients who have returned from tropical countries first need re-acclimatization in a warm climate such as Vichy or Vals, their transfer to altitudes of about 3,000 feet can then be effected. As an example of the results obtained by altitude and arsenic it is stated that one month's residence at La Bourboule raises the haemoglobin index from 7 or 10 to 11 or 12. It never, however, reaches the normal of 14. Increase in the number of red cells is marked and immediate and the count approaches the normal after one month and does not again fall. There is a note to the effect that the arsenical cure is contraindicated in cases with serious liver derangement. In conclusion the following list of French watering places is given in order of their richness in arsenical salts —

La Bourboule (about 2,550 feet) with 5.6 milligrammes of arsenic corresponding to 28 milligrammes of sodium arsenate and 31 minims of Fowler's Solution

Vic-sur-Cère (about 2,025 feet) with 3 milligrammes of arsenic

Saint-Nectaire (about 2,352 feet) with 0.8 milligrammes of arsenic

Royal (about 1,350 feet) with 0.7 milligrammes of arsenic

Le Mont-Dore (about 3,150 feet) with 0.4 milligrammes of arsenic

A B

ZONDEK (S G) **Erfahrungen über Malaria bei Chininprophylaktikern** [Experiences in Malaria occurring in Persons subjected to Quinine Prophylaxis] — *Berl Klin Woch*, 1919 May 26 Vol 56 No 21 pp 485-488

As a result of two years' observation of malaria in a Roumanian infectious diseases hospital the author records his experiences of the disease in patients who have been subjected to quinine prophylaxis. In a great number of cases it failed to prevent infection taking place, merely postponing the attack for an indefinite period and so producing latent malaria and many carrier cases. At any time the latent disease

can flare up and the stimulus rousing it into activity was frequently an infectious disorder, more especially enteric fever and typhus. Not only so but quinine prophylaxis can alter the character of the first malarial attack, rendering it quite atypical, so that it resembles the clinical pictures seen in the chronic form of the disease. The prognosis was more unfavourable in those who had undergone quinine prophylaxis than in those not so treated, owing to the tendency to relapse and chronicity. In such cases cardiac disturbances were apt to occur. A combined therapy of quinine and salvarsan was found useful in many instances where patients had become habituated to quinine.

Temperature charts show the types of fever encountered, indicate the effects of quinine and neosalvarsan and demonstrate the influence of enteric and paratyphoid fevers on the malarial infection.

A B

WERNER (H) *Neuere Probleme der Malariaforschung* [Newer Problems of Malaria Investigation]—*Berlin Klinik* 1919 June Vol 29 No 324 pp 1-18

Werner points out that errors of various kinds have crept into what he terms the war literature of malaria and explains how these have arisen from lack of previous knowledge of the disease and the difficulty of access to what has been written regarding it. He then passes in review a series of questions on which the war has thrown fresh light.

For one thing it has shown how the incubation period may be inordinately prolonged, a phenomenon often erroneously attributed to the use of quinine. The disease may apparently remain wholly dormant for several months.

For another it has demonstrated the value of the thick drop method of blood examination. Werner finds that the usefulness of this method is not enhanced by a previous combined centrifugation and haemolysis of the blood, as recommended by STAEBLI and HEGLER, for the parasites are thereby much distorted and it may not be easy to recognise them with certainty. He has had no experience of methods of centrifugation without haemolysis, as employed by SERENI and BASS & JOHNS [see this *Bulletin*, Vol 7, pp 266-268], but these have yielded good results in the hands of HALLENBERGER.

He speaks highly, however, as regards the importance of the parasite count as a means of checking therapeutic results.

Much has been written as to the supposed unity of the malarial parasite [see above (papers by ARMAND-DELILLE and EISENHART)] According to the author the phenomena advanced in its favour may be explained in terms of the biological peculiarities of the mosquito vectors. Werner himself does not believe in the unitarian theory.

Observations made in Russia led him to consider that hereditary transmission of the malarial parasite through the mosquito may occur, but he did not succeed in obtaining experimental proof of it.

It has been shown during the war that hibernating anophelines can withstand winter temperatures of 10 to 20° C below zero and that anophelines are attracted by the odour of human excrement.

The discovery by REICHENOW that in the Cameroons the gorilla suffers from a malaria resembling the human tropical form and harbours crescents is stated to be of theoretical and possibly practical importance. The observations were made shortly before the war.

Werner then considers the question of so-called quinine resistance of the malaria parasites and points out that he and others had prior to the war worked at this question, and he refers to the three grades of resistance which he recognized in his Brazilian cases. He thinks that the possibility of the transference of quinine resistant strains through the mosquito cannot be dismissed, as certain epidemiological facts point to its occurrence.

He then proceeds to discuss questions of quinine excretion and provocation methods, several papers on both of which have recently been reviewed in this *Bulletin*, but he throws no fresh light on these subjects. The same is true of his succeeding remarks on treatment which, however, constitute a brief but excellent summary of our existing knowledge on the subject. He compares quinine and salvarsan therapy, discusses each in considerable detail and mentions the combined treatment which he introduced before the war and which he considers merits further attention. Other curative agents are briefly mentioned and finally the vexed question of quinine prophylaxis receives attention. Three chief forms are described —

1 KOCH's long-interval method, 1 e, one gramme of quinine every 9th and 10th day

2 ZIEMANN's short-interval method, 1 e, one gramme at least every 1 days

3 CELLI's daily prophylaxis, 0.25 gramme to 0.4 gramme every day, in one dose or given morning and evening

The last was modified by FULLEBORN in Macedonia, where on every 4th and 7th day he increased the daily dose of 0.3 gramme to 0.9 gramme.

The advantages and disadvantages of the above methods are discussed, but nothing is brought forward with which the readers of the *Bulletin* are not already familiar and no definite recommendation is made, though experience in the war is said to favour CELLI's method.

A B

DR GREGORIUS (Antonio). Fórmulas palúdicas clínico-microscópicas (2da parte). Valor de la investigación hematológica y de la observación clínica para juzgar de la incapacidad al servicio militar. [Clinical and Microscopical Formulae in Malaria. Value of Blood Examination and of Clinical Observation in determining Incapacity for Military Service]—*An. del Depart. Nac. de Hig.*, Buenos Aires 1919 May & June Vol 25 No 3 pp 49-61.

The author sums up his conclusions on the above subject in the following terms, making use of certain graphic formulae which he has devised for indicating the condition of his patients both from a clinical standpoint and from their blood condition as regards the presence or absence of parasites.

1 In uncomplicated malarial infections incapacity for military service is always of a temporary nature.

2 The incapacity is determined by blood scrutiny = s (sangre) and by clinical examination = c

These letters may form various combinations with plus or minus signs, of which four are cited as fundamental

(i) Formula $\begin{pmatrix} s+ \\ c+ \end{pmatrix}$ indicating incapacity on both counts

(ii) Formula $\begin{pmatrix} s- \\ c- \end{pmatrix}$ indicating no incapacity

(iii) Formula $\begin{pmatrix} s+ \\ c- \end{pmatrix}$ indicating no incapacity even though the result of blood examination is positive, a condition met with in chronic malaria

(iv) Formula $\begin{pmatrix} s- \\ c+ \end{pmatrix}$ indicating incapacity based solely on the result of the clinical examination

In the course of his paper he indicates how one formula may be transformed into another as the result of treatment or owing to some other cause

A large part of the paper is devoted to a general consideration of malaria, including its latent forms, and the author records some of his investigations on the presence of pigment-bearing leucocytes, which he finds more numerous in febrile than in larval malaria and which sometimes precede the appearance of parasites in the peripheral blood. He has noticed that they are notably increased during the first days of quinine treatment. There seems to be no relation between their number and the type of malaria

A B

BOURCART (J) & LAUGIER (H) *Action de changement d'altitude sur l'éclosion des accès de Paludisme secondaire*—*C R Soc Biol* 1919 Nov 15 Vol 82 No 28 pp 1165-1168

The authors give an account of the influence of altitude on malarial relapses. The battalion to which they were attached had been stationed from the beginning of winter until August in Albania at an altitude of from 800 to 1,400 metres, it was then moved to a position at a height of from 2,000 to 2,370 metres. At this place an increase was observed in the number of sick reports on account of unduly rapid fatigue, breathlessness on effort and epistaxis, the last-named sometimes prolonged and difficult of cure. About the end of the first week's residence at this altitude the number of relapses of malaria became accentuated (the battalion was not heavily infected, about 20 per cent having previously suffered), but only for a short period, which probably coincided with the time required for acclimatization to the new conditions. The incidence then fell to what it had previously been when the troops were at the lower altitude, but further observation was not possible as the authors left the battalion. It is pointed out that cold usually causes an immediate recurrence, but in this case the change did not have effect until after about eight days' residence in the colder climate and it is possible that lowering of pressure and not of temperature was the determining factor. The authors consider the facts observed capable of two interpretations. On the one hand circulatory changes due to the altitude may assist the access to the

blood stream of malarial parasites which have been lying dormant in internal organs, on the other, the increase in blood production may favour this temporary hyperactivity of the haematozoa

A B

CLAPIER **Index palustre chez les indigènes de la commune de Bangui (Afrique Equatoriale Française)**—*Bull Soc Path Exot* 1919 Oct 8 Vol 12 No 8 pp 538-549

A paper of merely local interest dealing with malarial incidence amongst the natives of the commune of Bangui, situated on a large tributary of the Congo in French Equatorial West Africa. As no good purpose is served by reviewing it in detail the chief findings have been incorporated in the following table —

Malarial Index

	No ex amined	Per cent Positive	Per cent <i>P falciparum</i>	Per cent <i>P vivax</i>	Per cent <i>P malariae</i>
Children 0-6 years	268	76.8	43.2	46.6	10.1
„ 7-15 „	119	48.7	44.8	51.7	3.4
Adults (women)	64	23.4	33.3	66.6	0.0

A map on the usual lines illustrates the article

The splenic index amongst 387 children up to ten years old selected from 19 villages was 62 per cent

A B

TRINIDAD AND TOBAGO **Malaria Report Spleen Census, 1918** [C F LASSALLE Deputy Surgeon General and Medical Insp of Health] —Council Paper No 100 of 1919 Printed at the Government Printing Office, Port-of Spain pp 10 [Price 6d]

A report by the Deputy Surgeon-General and Medical Inspector of Health, embodying the results of a very extensive spleen census taken in Trinidad and Tobago in the latter part of 1918, mostly in school children. Sixteen of the 21 tables refer to Trinidad, 3 to Tobago, one of the remaining two is of the nature of a summary, the other a comparative statement contrasting the state of things in 1913-14 with that present in 1918.

The following headings are employed in the general tables (1-19) —

Medical Districts Villages Estates	School	No of Children Examined	No of Enlarged Spleens	Percentage	No with Anaemia Present
		Percentage		Date of Examination	

It will be seen that there is no record of the children's ages in the tables, nor is this point mentioned in the covering remarks, which show that 20,590 children were examined, of whom 2,420 had splenomegaly, the percentage being 11.2

The author contrasts this figure with those obtained from Mauritius and Ceylon and those applying to Trinidad and Tobago in 1913-14 and 1914. The 1918 figure compares very favourably with the Mauritius and Ceylon figures which, however apply to the years 1907-8, and is considerably lower than the local 1913-14 and 1911 figures, which were respectively 17.91 and 14.109.

The highest percentage was 70.2, the lowest, 0.1 in the Port-of-Spain district [where anti-mosquito operations have been very active].

In 8 districts there was a distinct increase as compared with 1913-14. In 11 there was a satisfactory decrease and Lassalle is hopeful that the regular and persistent application of preventive measure will soon greatly reduce the prevalence of malaria.

A B

FLEBBE (H) **Ueber die Malaria im Taurus (Kleinasien)** — *Deut. Med. Woch.* 1919 Oct 9 Vol 45 No 41 pp 1138-1140

A second paper by Flebbe. It is of the nature of a polemic in which he replies to the criticisms of SCHILLING and BENTMANN on his previous contribution [See this *Bulletin*, Vol 13, pp 280-281, Vol 14, pp 78 & 304].

His arguments are concerned with the comparative value of different measures of malarial prophylaxis but there is nothing calling for special notice. He is one of those who oppose quinine prophylaxis, especially in tropical malaria, but, as he admits that his experience of malaria is limited to the Taurus, his opinion does not carry great weight.

[As has been said elsewhere, there is a distinct danger that conclusions regarding quinine prophylaxis derived solely from war experience will be applied generally a risk to be deplored.]

A B

GIOSEFFI (M) **Zur Typhusbekämpfung in Malariagegenden Beobachtungen bei zwei dorfliehen Epidemien in Istrien** [Control of Typhoid in Malarial Regions. Observations on Two Small Village Epidemics in Istria] — *Wien. Klin. Woch.* 1919 Sept 25 Vol 32 No 39 pp 962-964

Two epidemics of enteric fever amongst villagers in localities where all three types of malaria were present are described in great detail. Under such conditions the author insists on the necessity of carrying out observations both as regards typhoid and malaria and states that in the case of the enteric infections he found Ficker's reagent or a modification of it in the form of a formalized broth culture of *B. typhosus* very useful as a diagnostic agent. He also advocates the establishment of a central bureau of information for giving advice as to the best means of dealing with malaria.

A B

CRESPIN (J) & ATHIAS (G) **Le paludisme a Alger Difficultés du diagnostic avec la fièvre typhoïde. Cas de *Pl. falciparum*** — *Bull. Soc. Path. Exot.* 1919 Oct 8 Vol 12 No 8 pp 504-509

After some general observations on the incidence of malaria in Algiers the authors allude to the difficulty under certain conditions of

distinguishing between typhoid and malaria and the need of care when instituting treatment. Thus it is possibly harmful to administer quinine in cases of profound anaemia in which malaria is merely suspected, because there is a risk of inducing further blood haemolysis. Anti haemolytic agents such as calcium chloride or cholesterol may no doubt be combined with the quinine, but neither, and more especially the latter, has had its action *in vivo* sufficiently studied. In order to show how easy it is, despite every precaution, to fall into error two examples of malaria attacks are described which were regarded as cases of typhoid fever. A boy and girl of the same family were affected and blood examination having been deferred for 24 hours the boy died and the girl only recovered with difficulty. Intestinal haemorrhage in the case of the brother suggested enteric and the sister was supposed to be suffering from the same disease although the authors were struck by her earthy colour and her profound anaemia. The boy did not present so intense an earthy hue. Blood examination immediately proved the cases to be examples of malignant malaria. Auto haemotherapy was found useful in the case which recovered. No details are given of the method employed.

A. B.

PARROT (L.) **Paludisme et Mortalité Indigène en Algérie** (Essai statistique) — *Arch Inst Pasteur de Tunis* 1919 Oct Vol 11 No 2 pp 107-110

This statistical paper is chiefly of local interest and moreover, owing to figures for the entire colony not being available, deals only with statistics of the rural district of Am-Touta, lying at a mean altitude of 800 metres. The years being classified as malarial and non-malarial, the following figures as regards infant mortality are forthcoming —

Average number of deaths per 1,000 children

	Age 1 day to 1 year	Age from 1 year to 2 years
Malarial years (1909, 1911, 1913, 1917)	121	68
Non malarial years (1908, 1910, 1912, 1914, 1915)	90	48

Average monthly death rate per 1,000 children, from 1908 to 1917

	Jan	Feb	Mar	Apr	May	June
Malarial years	5	8.4	6.5	4.2	4.5	3.4
Non malarial years	7.5	6.3	5.6	5.7	3.1	3.8
	July	Aug	Sept	Oct	Nov	Dec
Malarial years	6.3	13.5	14.3	14.3	8.2	7.3
Non malarial years	4.4	5.1	8.8	7.2	5.9	5.1

The author considers that the above figures show without doubt that the increase of death-rate amongst children up to 2 years of age is largely due to malaria.

A. B.

SUMMONS (Walter) Incidence of Malaria amongst Troops on a Transport to Australia from Egypt and Palestine—*Med Jl Australia* 1919 Aug 2 Vol 2 No 5 pp 86-88

Of 131 malaria invalids on board a transport 80 were placed on quinine during the voyage. A proportion of these [number not stated] were treated by quinine orally, and five of them were admitted to hospital with recurrence, thus demonstrating clearly in the author's opinion that this method of administration is inadequate. He noted that benign tertian parasites predominated in the relapse cases. It is considered that there is only one satisfactory method of treatment for relapse cases, viz., intramuscular injection. Ten to fifteen cc of a solution of bihydrochloride (0.06 gm per cc) were given daily for 3 or 4 days and this brought the infection rapidly under control. Quinine should then be continued for 2 or 3 weeks in 3 daily doses of 1 gm, [method of administration not stated] followed by a two months' course of 4 gms weekly. Blood tonics such as iron and arsenic are also indicated. The author presses for a uniform mode of treatment after demobilization in Australia.

A B

VAILLANT (Louis) Note sur le Dispensaire antipaludique du Gouvernement Militaire de Paris—*Bull Soc Path Exot* 1919 Oct Vol 12 No 8 pp 549-558

This is a resume of observations and results obtained at the Antimalarial Dispensary attached to the Pasteur Institute and Hospital Vaugirard over a period of 11 months (August 1917 to July 1918), during which 7,000 malaria cases were treated according to the scheme laid down by M. MARCHOUX in his communication to the Academy of Medicine on 7th August, 1917. Generally speaking the observations, which included general clinical examination and blood scrutiny, were in the nature of supervision of out-patients engaged on their normal work, except when actually suffering from a malarial "attack." Prevention of relapses was especially studied. For blood work the thick drop method is advocated. Microscopic examinations were carried out at the Dispensary twice weekly at intervals of 3 or 4 days and the patients were kept until the results were known. If negative, they returned to work, but if the result was positive 15 grains of quinine were administered, and this was found to be sufficient in every instance [presumably to prevent a febrile relapse]. In certain cases the dose was repeated, but not augmented.

Medical supervision terminated after 17 consecutive and negative examinations or after 8 weeks' attendance. As, according to the author, in the case of *P. vivax*, parthenogenesis of the female gametocytes occupies a period of 14 days, he considers that this method of treatment will prevent the development of four generations thus produced and hence will probably definitely prevent the occurrence of further febrile attacks. [It would seem that we have here no less than three assumptions.] If all the blood examinations were negative for a period of 56 days the patient rejoined his unit.

While the above treatment sufficed in the case of benign tertian it was found not to have the same value in malignant cases, where it is desirable to keep the patient constantly under the influence of quinine so that the merozoites are attacked whenever they are set free. With this end in view carriers of malignant malaria were examined thrice weekly and, whatever the result of microscopical examination, 15 grains of quinine were given three times weekly for six weeks. This scheme was tried in November, 1917 but was further modified, as it did not prove effective, and in March, 1918, a daily dose of 15 grains was given to this class of patient with good results.

During the period August, 1917, to July, 1918, of the 7,000 malaria cases under supervision 3,000 never showed parasites in the blood and 250 were sent to hospital, but only 46 of these for malaria. Of over 3,900 cases found positive on blood examination 3,417 were benign tertian and 539 malignant tertian infections. Details of the percentages found positive on examination are shown in the following group table —

From 1 to 4 positive examinations	78.4 per cent
„ 5 „ 8	16.5 „
More than 8	5.1 „

The great majority of the benign malarial subjects did not take more than 15 grains of quinine after each positive examination, and only on those occasions. The author therefore holds that 30 to 45 grains of quinine are sufficient to prevent the development of successive generations of malarial organisms and to effect a cure in more than 75 per cent of cases of benign tertian infection. Charts and tables are included showing the various points considered.

[This paper has been reviewed at some length as the results recorded are contrary to the general experience of British medical men in the treatment of malaria acquired in war areas, though in some respects analogous to those obtained by Ross and his colleagues. See this number of the *Bulletin*.]

A B

TANZER (Ernst) & OSIFERWALD (Hans) *Anopheles und Malaria in Halle. Zugleich ein Beitrag zur Morphologie und Biologie der Larve von Anopheles maculipennis Meigen* — *Beihfte. lich f. Schiffs- u. Trop.-Hyg.* 1919 July Vol 23 No 2 pp 9-48
With 27 figs., 2 plates and 1 map

In an introduction the authors refer to the large number of malaria infected soldiers returning to Germany and the necessity which has arisen of establishing hospitals for their treatment. Such a hospital has been instituted in Halle and hence it became necessary to determine what danger existed of a spread of malaria in that town. For this purpose they undertook an investigation into the distribution of anophelines in Halle and its neighbourhood. Attention was concentrated on the larvae rather than on the imagoes because, as NUTTALL has pointed out, this form of investigation is "the most rapid method of detecting the presence of these insects in a given district." As a study of the literature showed that little is known as regards the development of the larvae of *A. maculipennis*, the authors have devoted some time to the investigation of this point.

They begin their paper with some geographical notes and details as to climate, which are chiefly of local interest. They have shown that the average summer temperature of Halle is 17.9°C and further that from May 26 to September 12, 1918, the average temperature was over 15°C . As the necessary temperature for the development of the malarial plasmodia in the mosquito lies between 15° and 17°C it is evident that the temperature conditions at Halle are suitable for such development.

Considering the biology of the larvae of *A. maculipennis* the authors note that the larvae are not found in well shaded waters nor are they present in very foul waters. They have a preference for small water collections and when they do occur in large sheets of water it is the zone of vegetation along the shore or the neighbourhood of floating vegetation which is found to be infected. In running waters they favour stagnant reaches studded with vegetation and are not present in waters free from vegetation and with surfaces which are apt to be disturbed. This last observation seems to explain the freedom of village pools more than the presence of water fowl, such as ducks, though no doubt the latter are to some extent effective in keeping the pools free. Along with GRASSI and other authors they dissent from the view of KERSCHBAUMER that larvae are not found in water collections of a greater depth than 1 metre. Anophelines prefer waters well supplied with weeds but no species of the latter seem to be specially attractive. Their function appears to be to protect the larvae from wave action and this seems also to be true of the thread algae, while other algae (unicellular) serve as food.

The detailed and illustrated section on the morphology of the larvae is of interest only to the entomologist and need not here be discussed, but that dealing with the question of generations is of some interest as the observations show that between May and October there is no time in which larvae are quite absent while at all times the most diverse developmental stages are found co existing.

There is a brief note showing the correlation between the generation period of anophelines and the yearly curve of malaria infection, and a historical section dealing with the early and recent records of malaria in Halle. This shows that the disease was formerly much more common than it is at present and the diminution is attributed chiefly to the better social conditions which now obtain.

The paper concludes with an account of prophylactic measures, which contains nothing of special interest though it may be noted that the authors' observations show that neither the carnivorous water bladder, *Utricularia vulgaris*, nor the duckweed acts as a mosquito deterrent.

A short appendix gives an account of a case of tertian infection occurring in a boy at Halle in 1918 and mentions that the authors have been able to prove that *A. bifurcatus* occurs in the neighbourhood of the town as well as *A. maculipennis*.

In addition to the illustrations of anopheline eggs and larvae there is a map showing the various kinds of breeding places in the neighbourhood of Halle and the places where the larvae of *A. maculipennis* were found both in the town and its surroundings in 1918. The heights above sea-level are indicated.

A. B.

BOHME (A) **Malariabeobachtungen im Westen** [Malaria Observations on the Western Front]—*Med Klinik* 1919 May 11 Vol 15 No 19 pp 458-462

A paper based on observations on some 1,000 cases of malaria in hospitals serving the western German front. The author considers that the malaria in the Western area presented many peculiarities, but a perusal of his paper shows it to be on the same lines as several recent German dissertations on malaria in the East.

He lays stress on seasonal influence in malaria, which he found operative both in primary attacks and in relapse cases, both of which were more frequent during the warm months. In the relapse cases there appears to be a direct climatic action on the infected individual.

The only point which need here be mentioned is the routine treatment adopted, which closely followed that recommended by NOCHT and was as follows—On each of the first five days one gramme of quinine intramuscularly and half a gramme by the mouth. Then after a three days' interval 1.2 gramme by the mouth only. As a rule three quinine days "alternated with four free of quinine. After a fever-free period of five weeks the patient rejoined his unit but continued taking quinine for another seven weeks on two consecutive days each week. If relapses occurred the patient was treated as a new case.

In severe attacks quinine urethane by intramuscular injection was found useful. A combined therapy of quinine and neosalvarsan appeared to be of value in lessening the number of relapse cases. Two injections of neosalvarsan (0.6 gramme) were given at an interval of one week during the administration of quinine.

The author considers provocative methods of value from a diagnostic standpoint, i.e., in determining whether the cure is complete.

A B

WORNER (Hans) **Ueber chronische Malaria**—*Med Klinik* 1919 June 15 & 22 Vol 15 Nos 24 & 25 pp 586-589, 612-614

The first instalment of this lengthy paper is concerned with a general discussion of the nature of chronic malaria, but it contains nothing of special interest and records no new facts. The author, however, insists on the view that malaria, like most protozoal diseases of the blood, is really a chronic disease from the outset and that the acute attacks are merely exacerbations of the chronic infection.

The second part of the paper is devoted to treatment and is largely concerned with a review of the methods employed by other authors. Worner himself followed NOCHT's method of divided doses, giving, in the form of tablets or acid solution, daily doses of from 1 to 1.2 gramme of quinine hydrochloride in benign tertian cases and of 1.5 to 1.8 gramme in malignant malaria, this dosage being continued till the fifth day after the temperature has fallen. A four days' interval followed, then three days of quinine and so on for a period of six weeks. Although the author does not claim that this method sterilized his patients, he states that it induced a latent period of several months. Of 44 cases of tropical malaria treated as above and watched for two or three months only one relapsed. [Unfortunately the author does not give any details of his results in the benign tertian cases.]

In carrier cases showing crescents the following method of treatment was adopted which, as will be seen, is a combination of quinine and provocative measures —

- (a) 3 days 2 0 to 2 5 grammes quinine in hourly doses of from 0 2 to 0 3 gramme, at the same time two to four hours stimulation of the spleen
- (b) 5 days interval
- (c) 3 days 2 0 to 2 5 grammes quinine with stimulation of the spleen
- (d) 5 days interval, and so on

The pause in treatment was instituted to enable the patient to recover from the unpleasant effects of the quinine and the efficacy of the treatment was tested by examinations of four thick drop preparations. After a negative result was obtained the usual after treatment recommended by Nocht was carried out for two to three weeks (see above)

The following table gives the results obtained —

Number of cases	Total quantity of quinine	Duration of treatment
14	21 grammes	19 days (including intervals)
13	25 „	27 „
6	33 „	34 „
3	42 „	41 „
1	48 „	51 „

Although this method was effective in banishing crescents from the peripheral blood it was unable to bring about complete sterilization of the patient

The author's experience of neosalvarsan is not of such a nature as to cause him to recommend it for the treatment of gametocyte carriers, but he considers it useful in the general treatment of malaria and in improving the state of the blood. His other remarks on treatment do not possess any special value

A B

JAMES (S P) *The Risk of the Spread of Malaria in England and the Measures Necessary to prevent it—Proc of the Clinical and Scientific Meeting, Brit Med Assoc, London April 8th-11th 1919 pp 254-262*

At this meeting it was hoped to collect observations and opinions upon

“(a) The danger of malaria carriers in this country and the chances that the disease would become endemic in new centres

“(b) The different types of malaria in the several war areas, and the question of differences of strain in the malignant tertian or the benign tertian parasites

“(c) The value of quinine in preventing new infections and relapses

As regards (a) —The number of cases reported in the years specified, are given in the subjoined table —

Malaria contracted in England

	Navy	Army	Civilians	Totals
1917	25	163	43	231
1918	9	61	25	95

From maps showing the distribution of Anophelines it is evident that in many rural districts in England into which a carrier may go there is potential risk of the occurrence of locally contracted cases of malaria.

On demobilization James stated that some 500 known carriers would be scattered over England, many proceeding to localities where anophelines are present.

His observations on the mosquitoes visiting dwelling houses are very interesting, but too lengthy to review in detail. One may, however, note that *A. maculipennis* only infrequently visited and remained in houses of modern design with well lighted and ventilated rooms and without many curtains and other hangings, providing safe and dark resting places. In old cottages, the converse of the modern design of house and furnishing many safe resting places, on the other hand, *maculipennis* was a frequent visitor and remained after entering. [For similar observations in Germany see paper by TANZER and OSTERWALD reviewed above.] The mosquito seeks not only food but a safe resting place and thus the risk from malaria, even in a place where anophelines are abundant, depends largely on the type and design of the house inhabited. Moreover it seems that the mosquitoes first investigate the possibility of a safe retreat before feeding, accordingly if they do enter a modern type of house they very frequently leave it without having bitten the inhabitants and proceed further in search of a suitable house before settling down. Furthermore, James gave his opinions on two important points which may be thus summarized —(1) Under the conditions following demobilization it would be practically impossible to find a locality in England in which, for preventive purposes, anti-mosquito measures would be "worth the candle." (2) It would pay better not to whitewash cowsheds in an attempt to make them unattractive to mosquitoes, but rather to leave cowsheds as suitable resorts for mosquitoes to which they will return after their flights, and instead to whitewash all dark and dirty corners of human dwelling houses in the vicinity, so that these be made unattractive to the insects and accordingly comparatively mosquito-free.

A discussion followed James's paper and BASSETT-SMITH gave the following information as regards naval cases under heading (b)

(1) The Eastern Mediterranean produced almost invariably severe relapsing cases of the subtertian variety. Intense malarial cachexia was frequently present as a complication, as also was dysentery.

(2) Mesopotamian cases were, as a rule, less severe than the above but were also often accompanied by dysentery.

(3) German S E African cases, though often of the non malignant tertian type, were frequently very severe.

(4) African West Coast cases were always subtertian, generally severe, and relapses were very frequent. Mixed infections were common from the Cameroons and filariasis was a frequent concomitant.

Angus MACDONALD cited the value of anti-mosquito measures in selected areas in England, such as Sandwich, when these were thoroughly carried out *maculipennis* became rare in military quarters and the incidence of indigenous cases fell from 69 in 1917 to 6 in 1918. He considered the whitewashing of cowsheds a method of value and suggested that in summer the mosquito does not frequent sheds very

much as the animals (viz, the food supply) are out in the fields, consequently human habitations are selected by mosquitoes at this season of the year

As regards (c) he held that quinine as a preventive of malaria was practically useless, and this view was supported by WHITFIELD and WILLOUGHBY as a result of their experiences in Macedonia. BACOT on the other hand pointed out that the conditions during the war were abnormal and that it would be unwise, as a result of war experience, wholly to condemn quinine as a prophylactic, considering the experiences of many in days prior to the war. He considered true quinine prophylaxis to be largely a question of dosage—the dose of sporozoites and the dose of quinine. [This is in agreement with the conclusions reached by GOSSE as the outcome of observations in Mesopotamia, see below]

Malcolm WATSON stated that he found that quinine prophylaxis amongst labourers in the Malay States gave most disappointing results.

As regards relapses J. Gordon THOMSON holds that quinine will prevent them if properly given. Oral administration is advised, and it is to be noted that benign tertian malaria is more prone to relapse than the malignant variety.

MURRAY, from a considerable experience of relapse cases in England during which numerous drugs were tried for anti-relapse purposes, finds that quinine is the best, and that compounds of arsenic are useful adjuvants. He believes in oral administration of 30 grains in 10-grain doses daily for 3 or 4 weeks, followed by 10 grains daily for a prolonged period, say 3 to 6 months.

BACOT did not agree with James's conclusion that anti-larval work was practically impossible in England and considered the advice not to whitewash cowsheds was based on insufficient evidence.

A B

PEZZI (C) *La Malaria nell'ospedale militare "Mantegna" di Milano nell'anno 1918* [Malaria. Experiences at the "Mantegna" Military Hospital, Milan, in 1918]—*Policlinico Sez. Med.* 1919 May 1, and June 1. Vol. 26 Nos. 5 and 6 pp. 199, 208, 239-245.

The author combats the French view that there is only one species of malaria parasite. In 125 cases of malaria under his care in which a blood examination was made, 93 were found to be benign tertian, 29 malignant tertian, 2 mixed tertian and 1 quartan. Of the benign tertians 28 were first attacks and 65 relapses. Of the malignant on the contrary 26 were first attacks and only 3 relapses. The author suggests the following explanation: "In regions of intensive malaria prevalence both varieties of haematozoon, *praecox* [*falciparum*] and *viva* are found. The mosquito probably inoculates both forms with its bite. The more virulent *praecox* gains at first the upper hand but gradually substances are formed which inhibit its further development. A free field is thus left for the development of the *Plasmodium viva*, which, multiplying, causes a relapse, no longer, however, of malignant but of benign tertian malaria." The author emphasizes the importance of early diagnosis and states that a considerable number of patients were sent into hospital as cases of typhoid or influenza. Albuminuria.

was very rare in *vivax* infection, more common and occasionally abundant in grave cases due to *praecox*. Coming to treatment the author pins his faith to quinine. Aisenic is a useful auxiliary as a general blood tonic. The hypodermic [intramuscular?] method of administration of quinine has, in the author's view, nothing to recommend it, and possesses certain disadvantages. The oral method he considers as efficacious, in the great majority of cases, as the endovenous without the drawbacks of the latter. The use of concentrated solutions of quinine for endovenous injection should the author holds, be entirely abandoned. The endovenous method should be reserved for grave cases, by which term are understood both cases in a sub-comatose condition and presenting irreparable blood dyscrasia, and those malignant tertian cases diagnosed early and dangerous on account of the continuous form of their pyrexia.

F S A

FOWLER (Robert) **The Risk of Malaria in Australia**—*Med J Australia* 1919 Aug 2 Vol 2 No 5 p 83 With 1 chart & 1 map

It is pointed out that nearly 10,000 malaria infections have occurred in Australian troops in Egypt, Syria, Salonika, Mesopotamia or New Guinea and the author writes to warn the Australian medical profession on (a) the probability in the near future of having to treat a considerable number of malarial relapse cases, a large proportion of which will be of the malignant variety, and (b) the risk of infection being spread by Australian anophelines with a consequent increase of cases in endemic areas. A chart is given showing the incidence of malaria in the Australian Mounted Division during September, October, and November, 1918, and there is also a map of Palestine and Southern Syria.

A B

FALCONER (A W) **The Pulmonary Manifestations in Malaria**—*Quarterly Jl of Med* 1919 Oct Vol 13 No 49 pp 25-34

At the outset the author mentions the views of various authorities on the vexed question as to whether a pure malarial infection can or cannot produce the symptoms and physical signs of bronchitis, pulmonary congestion and consolidation. He then proceeds to record his own experience in Macedonia during 1917 and refers to the work he carried out with ANDERSON in 1916 [See this *Bulletin*, Vol 10, p 156].

He classifies the pulmonary manifestations which he observed into the following groups—

"I Bronchitic II Pleuro pulmonary congestion with more or less definite evidence of consolidation III Massive collapse of the lung IV Concurrent malaria and pneumonia V Pneumonia occurring in chronic malaria without evidence of active malaria VI Pleurisy, either dry or with serous or haemorrhagic effusion."

Considering these *seriatim* he finds that

The *Bronchitic* type is much the most common and cites as a characteristic feature the way in which the stethoscopic signs vary within a few hours and flit from one portion of the lung to the other. An

aggravation of symptoms during pyrexia was noted and the sputum, generally profuse, is fairly characteristic, being thick, uniform, almost pure white and homogeneous, of cream-like consistency. The physical signs disappear with remarkable rapidity when quinine is exhibited in adequate amount. This, together with the character of the physical signs, points to the condition being the direct result of the malarial process.

Pleuro-pulmonary congestion with evidence of consolidation was not uncommon. Any part of the lung may be affected, not only the apex as in the cases described by French authors. The physical signs are those of pneumonia but general symptoms of pneumonia are lacking or are very slight. The physical signs vary with great rapidity. Many of the patients do not appear ill but sometimes the general condition is grave apart from the lung symptoms. Expectoration may be absent. The sputum is often like that seen in the bronchitic type but portions of it may be blood-stained and free haemoptysis may occur. Respiratory distress, if present, is usually more marked during the pyrexial period. There is no leucocytosis and the condition is amenable to quinine.

The records of two fatal cases in which autopsies were performed are given, as are accounts of two interesting cases showing extensive signs of apparent consolidation in the lungs without general pneumonic symptoms. In both *P. falciparum* was found in the blood.

Massive collapse of the lung appears to be not uncommon but is generally overlooked or described as pneumonia. It is most common in the left lower lobe and the mechanism producing it is obscure. It may be evanescent or persist for several weeks. Three instructive cases are described.

Concurrent malaria and pneumonia is not rare and the pneumococcus has often been recovered from the blood in such cases. They differ from the other conditions mentioned and conform, so far as pulmonary symptoms go, to the ordinary pneumonic type, being really examples of pneumonia complicating malaria, as well exemplified in an account of two cases. Once the lung symptoms are definite quinine treatment does not influence the condition.

Pneumonia in chronic malaria differs little from the preceding and does not merit special notice.

Dry or wet pleurisy. The former is not common, the latter is rare. [This is a valuable clinical paper and should be consulted in the original by those interested, as the case records are instructive though unfortunately too lengthy for reproduction in a review.]

A B

HUME (J B) Enlargement of the Thyroid Gland in Malaria — *Brit Med J* 1919 Nov 22 pp 661-662

Some thirty cases of thyroid enlargement occurring as a complication of malaria came under the author's notice in the East African campaign and he himself was a sufferer from this condition.

The enlargement is acute, affects either one or both lobes of the thyroid gland and occurs from 12 to 30 hours after the fall of the temperature.

All the cases seen occurred amongst white troops, the majority of whom had had several attacks of malaria. In none of them was there any family history of thyroid disease or of previous abnormality affecting that gland. In every case malarial parasites were present in the blood, *P. falciparum* predominating but *P. vivax* and mixed infections were also demonstrated. There was no opportunity of studying the condition at an autopsy.

In a typical case the enlargement appeared suddenly after a pyrexia lasting from one to three days. It was neither accompanied nor followed by fever. The gland became somewhat painful and tender on palpation. The swelling was uniform and the skin was not reddened.

Dysphagia was a prominent symptom and other features were pain and throbbing in the head, slight muscular tremor and tachycardia. Two cases only showed exophthalmos. A systolic bruit in the pulmonary area or an accentuation of the second sound was not uncommon. In 70 per cent of the cases splenomegaly was present. The usual quinine treatment of malaria followed by arsenic was adopted and in from four to ten days the swelling was usually markedly reduced. In the author's own case the enlargement, which developed in June, 1918, has not yet entirely vanished and he noted that the swelling increased during subsequent malaria attacks. An account of seven cases is given, including his own.

Since Hume drew attention to the condition at Dar-es Salaam in May, 1918, other medical officers have observed the complication, which is believed to be a distinct clinical entity present in from 5 to 10 per cent of cases of malaria. The possible cause is discussed. It may be a sporulation of parasites in the gland capillaries cutting off the supply of iodothyron from the blood stream and thereby upsetting "thyroid equilibrium," or the enlargement may be compensatory for the exhaustion of other parts of the endocrine system.

The influence of malaria on the ductless glands is briefly considered and the frequent occurrence in malarial regions of sexual infantilism, a condition associated with thyroid deficiency, is commented upon, as is the effect of malaria upon the adrenals and the testicles.

A B

ALAMARTINE (H.) *Les gangrènes palustres des membres.*—*Presse Méd.* 1919 Aug 21 No 46 pp 459-461

The author recalls the fact that VERNEUIL and PETIT in 1883 described cases of gangrene, the result of malaria. This complication of the disease had, however, been forgotten until recalled by the experiences in Macedonia.

These extensive gangrenes of the lower limbs, due to obliterative endarteritis and necessitating surgical interference, were observed in cases of malaria and were undoubtedly malarial in origin.

Three such cases are described, two terminating in recovery, one in death.

The gangrenous condition may be either moist or dry. The French literature on the subject from the time of VERNEUIL onwards is discussed and the occurrence of such cases in Macedonia is then considered. Apart from fairly frequent and slight cases of gangrene due to vascular lesions and conforming to Raynaud's disease, about 15 cases of massive,

gangrene resembling that encountered in typhoid fever were reported from the French hospitals in Salonika during 1916-17

The pathological anatomy of the condition is described. The endarteritis is of the usual type and very generalized. The lesions extend to the elastic fibres of the middle arterial coat but the outer coat is healthy though the vasa vasorum exhibit endarteritis with thrombosis. In all the viscera, and more especially those of the abdomen, these arterial changes can be demonstrated, resulting in the formation of multiple infarcts, interstitial haemorrhages and areas of simple or fat necrosis.

There seems no doubt that the pathogenic agent in producing this condition is the malarial parasite. Other causes such as syphilis and septicaemia, were eliminated. All cases examined showed an intense infection of the blood and viscera with the haematozoa. A short clinical description is given, three types being recognized —

- 1 Slow and dry like the gangrene of syphilis and old age
- 2 Rapid and associated with grave toxic symptoms
- 3 Limited and resembling what is seen in Raynaud's disease

The prognosis is best in cases of unilateral gangrene occurring in chronic cases of malaria and unassociated with severe attacks of the fever.

The third type may benefit from the administration of quinine and may not require drastic surgical interference. In the first type it is advisable to temporize and endeavour to save as much of the limb as possible but in the second type of "massive" gangrene it is essential to amputate at an early period. Delay may be fatal. An intensive quinine treatment should precede and follow the operation.

A B

POLLITZER (Hans) Ueber Volumen pulmonis diminutum (Chlorose, Morbus Basedowii, Malaria) [Diminished Pulmonary Volume in Chlorosis, Basedow's Disease and Malaria]—*Munch Med Woch* 1919 Sept 26 Vol 66 No 38 pp 1103-1106
With 4 figs

The author refers to the special form of percussion (chromopercussion) which he introduced for defining more accurately the limits of the thoracic organs. Its application in cases of chlorosis, Basedow's disease and latent and chronic malaria has shown that in all these conditions there is a diminution in lung volume. This is characterized by a retraction of the anterior border of the right lung so that the heart is uncovered, while the lower lung margin also recedes, laying bare the liver.

The condition is to be attributed to a pulmonary ischaemia due to persistent contraction of the lung vessels. In the case of chlorosis and Basedow's disease this would seem to depend upon a peculiarity of the blood distribution. In malaria, however, Pollitzer suggests that the contraction of the pulmonary vessels is the result of a reaction to the malarial toxin. He regards it as evidence of a latent malaria but admits that he has not had a large amount of material at his disposal for its study. When there is much retraction of the right lung, more of the heart appears to lie to the right of the sternum than is normally the case and X-ray examination may lead one to

think that there is a dilatation of the right heart and a diminution of the left. If, however, measurements are made it is found that the right heart is normal in size and, in cases with anaemia, even diminished in volume. The lung condition is amenable to quinine and the author is not prepared to regard any case of latent malaria as cured in which this pulmonary retraction persists.

A B

CORDIER (V) [**Malarial Pleurisy and Peritonitis**].—*Ann de Med* Paris 1919 June Vol 6 No 2 p 89 [Summarised in *Jl Amer Med Assoc* 1919 Sept 13 p 868]

Four cases are described typical of the pleural and peritoneal reactions. Effusion may or may not take place, but in the latter case meteorism, hiccough, vomiting and other symptoms suggesting perisplenitis or gall-bladder complication may be present. The effusion abounded in red cells with an almost pure mononucleosis. Eosinophilia never exceeded 8 per cent, and malarial parasites were not demonstrated in the fluid. The author is inclined to admit a direct action by the malarial organisms on the peritoneal and pleural serous membranes. In acute cases the severity of the abdominal symptoms may simulate peritonitis from perforation. No sequelae have been observed in the pleural cases.

A B

ROSS (Ronald) **War Experiences of Malaria**.—*Proc of the Chemical & Scientific Meeting Brit Med Assoc* London, April 8th-11th 1919 pp 273-276

The author considers that the following conclusions are pretty conclusively established—

1 Moderate doses of quinine—say, between 20 and 40 grains daily for adults—suffice in most cases to reduce both fever and asexual parasites in two or three days.

2 The sulphate, bisulphate, hydrochloride, and bihydrochloride of quinine are almost equally efficacious and their elimination by the kidney appears to be finally about equal.

3 Roughly, the three usual methods of administration (oral, intramuscular and intravenous) possess about the same value. Relapses occur with about equal frequency with all modes of administration after their stoppage. On the whole there seems to be no reason why oral administration should be superseded as a general broad procedure, but the clinical symptoms should determine the method adopted.

4 Rest in bed and good feeding are required during the attack and for four days subsequent to the fall of the temperature to normal.

5 In first attacks and in complicated and serious cases larger doses of quinine than detailed in 1 are usually advocated, but further investigation is required on this point.

6 Many consider that malignant cases require more rest and continuous treatment than do the other types of the disease.

As regards "anti relapse" prophylaxis, when patients are under good conditions with respect to food and exercise in the open air, a course of 60 to 90 grains of quinine per week has been shown to

render relapses infrequent A daily dose is advocated and it is essential to see that the quinine is really taken

As regards absolute cure, results are not nearly so definite The author doubts if the large doses employed in "sterilizing" treatments are justifiable in view of the good results of moderate dosage as in "anti-relapse" treatment when this is carried out for two or three months or, if further relapses occur, for a lengthier period He doubts the lethal effect on the plasmodia of quinine as quinine and suggests that the drug acts by stimulating the production of natural antibodies It seems true that at certain seasons relapses may be much more frequent and more difficult to cure than at others, and more evidence on this point may soon be forthcoming

He regrets the opinions that have been formed against prophylactic quinine and points out the differences between true prophylaxis (administration to those who have never had malaria) and anti-relapse treatment These are quite different but are frequently confused, to the detriment of the former

A B

DE GARIS (Mary C) *Notes on Malaria as seen in Macedonia*—*Med Jl Australia* 1919 Aug 2 Vol 2 No 5 pp 84-86

This account of malaria, mainly amongst the civil population in Macedonia, emphasizes the need for recognizing the protean nature of the disease [see review of paper by Marguerite WHITE in this *Bulletin* (Vol 14, p 265)], in addition to giving details of the treatment as adopted at the Scottish Women's Hospital, Ostrovo, Macedonia, where the author worked The usual treatment of the severe cases was about 12 intramuscular injections of quinine (quinine 0.4 gm, urethane 0.2 gm, in ampoule) and about 6 ampoules of cacodylate of soda [dose not stated], followed by about 12 grammes (20 grs) of quinine daily by the mouth and an iron and arsenic mixture subsequently The large dosage of 27 grammes (45 grs) daily of quinine by the mouth as advised by some, was not tried Adrenalin solution (5 minims) was generally given with the first injection of the day The quinine injections were administered every 4 hours the contents of two ampoules being often injected at a time, but on rare occasions two-hourly injections were given As the site for intramuscular injection, the outer side of the thigh, above the trochanter and below the iliac crest, was usually selected, no inconvenience in lying down being thus caused and nerve branches being sparse in this situation When long, large needles were used there were several complaints of localized anaesthesia and numbness and also, in the writer's opinion, deep quinine sores were more frequent Very short needles led to superficial sores, but one of medium length (say 2.5 cm long) and small bore was found most satisfactory As aids to diagnosis enlargement and frequently tenderness of the spleen and herpes about the mouth and on the nose, cheeks or eyelids were very helpful Herpes of the cornea was twice observed In one of the cases an almost perfect recovery ensued but the second (a neglected case) appeared as though a permanent leucoma would result As regards prevention protection against mosquito bites is considered of more value than prophylactic quinine

A B

HARRINGTON (F E) & BARRIER (Ethel) Observations in the Use of Pepsin-Quinin Mixture A Treatment of Malaria Carriers —
Southern Med Jl 1919 Aug Vol 12 No 8 pp 468-469

During malaria investigation work in Hattiesburg, Miss, in connection with the work of the U S Public Health Service at Camp Shelby, studies, lasting for one year during 1918-19, were made of the use of a quinine-pepsin mixture in the sterilization of malarial carriers. The objects were (1) to find the best percentage mixture, (2) the elimination of idiosyncrasies, (3) the effects of the mixture upon the plasmodia circulating in the blood. After careful investigation the following quinine-pepsin mixture was adopted —

Quinine sulphate	90 parts (by weight)
Milk sugar	6 " " "
Powdered pepsin U S P	4 " " "

Mix thoroughly and place in capsules No 0 or No 3

The mixture gave in capsule No 0 4.97 grains of quinine sulphate

Two groups of persons were selected (only those showing plasmodia in the blood being utilized) and the conditions controlling each group were comparable

The following table is submitted —

	Treated Patients	Control Patients
Total persons under observation	34	27
Date of administration of quinine	April 4, 1918	
Amount of quinine administered	10 grains daily	
Period of administration	One week	
Period of observation	Four weeks	
Date of blood examination	April 18, 1918	
Number of persons examined	32	27
Percentage of negative findings	57	59
Date of blood examination	April 25, 1918	
Number of persons examined	17	13
Percentage of negative findings	47	62
Date of blood examination	May 2, 1918	
Number of persons examined	9	8
Percentage of negative findings	22	13

"*Conclusion* —The administration of quinine pepsin mixture reduces the incident of unpleasant results about 70 per cent, as compared with the idiosyncrasies manifest following the administration of plain quinine sulphate, without any evidence of impairing the effect upon the plasmodia in the circulating blood"

A B

WILTSHIRE (H W) The Value of Intramuscular Injection of Quinine in the Treatment of Macedonian Malaria, and some Conjectures concerning Quinine Therapy in General—*Jl Roy Army Med Corps* 1919 Sept Vol 33 No 3 pp 251-261

The author places on record his view of the value of intramuscular quinine in the treatment of malaria originating in Macedonia. He is firmly of the opinion that this method of administration is more

efficacious than when the drug is given by the mouth. A 50 per cent solution of quinine bishydrochloride was used for the injection and as a rule, 20 grains of the salt were administered twice daily for four days. On the fifth day treatment was continued by the mouth, usually 30 grains of quinine sulphate or bishydrochloride in solution every day for not less than three weeks. The solution for injection was sterilized in an autoclave three days in succession before issue, and again every morning when in use. This did not appear to detract from its therapeutic value. Symptoms of cinchonism are, if anything, more marked after oral administration than after injection, pain at the moment of injection is slight, septic conditions are obviated by good technique, and no deleterious action on the heart has been noticed.

It is held that intramuscular injections are of more value than oral administration from the standpoint of (a) *Prognosis of life*, possibly, because the drug has a stronger action against parasites in the internal tissues (cerebral type, etc.) (b) *The effect produced during the acute stage*, due to greater certainty and rapidity of action. Haematological evidence supports this view. (c) *The chance of effecting a true cure of the disease*, because intramuscular administration is more lethal to spleen and marrow parasites than quinine by the mouth, as evidenced by (1) the great improvement noted in chronic malaria with cachexia and splenic enlargement and (2) the prevention of relapses in cases treated intramuscularly. These showed far fewer relapses than those given oral quinine, (5.5 per cent as against 43.7 per cent).

The author furthermore records certain "Conjectures concerning quinine therapy in general." It is considered that an unstable quinine proteid compound is the most efficacious in destroying malarial parasites and experiments of the author and others are cited to show that (a) Intravenous injections of strong solutions give rise to a large amount of unstable quinine proteid compound, which is rapidly distributed over the body and produces the most rapid and powerful anti-parasitic effect. (b) Intramuscular injection gives rise to a fairly large production of unstable proteid compound, dissemination of which is, however, comparatively slow. The anti-parasitic effect is correspondingly slow compared to intravenous injection, but it is certain and sure. (c) Oral administration results in a comparatively small production of unstable quinine proteid compound, so that, though the dissemination over the body is rapid, the anti-parasitic effect is relatively small.

The author believes that cinchonism is caused by the quinine which circulates in simple solution and not by quinine circulating in combination with proteid, and this suggestion is supported by MACGILCHRIST'S minimal lethal dose experiments. The writer summarizes his conjectures as follows —

"(a) The real anti-parasitic agent is to be found in an unstable combination of quinine with a proteid of the blood plasma.

"(b) The quinine which circulates in the blood in simple solution and is excreted in the urine unchanged, may be regarded as a waste product and is innocent of anti-parasitic effect.

"(c) Some of the toxic effects produced by quinine on the body are due to the unchanged quinine which circulates in the blood in a state of simple solution."

DUDGEON (Leonard S) **On the Effects of Injection of Quinine into the Tissues of Man and Animals**—*Jl of Hygiene* 1919 Oct Vol 18 No 3 pp 317-336 With 1 plate

The author, who was Consulting Bacteriologist to the British Salonica Force, was requested to carry out an experimental enquiry on animals as to the effects produced by intra muscular injections of strong solutions of quinine. Cast mules and horses, rabbits, guinea-pigs and frogs were used and the preparations of quinine were—(a) bi hydrochloride in saline (b) acid sulphate in saline (soon abandoned), (c) quinine alkaloid dissolved in alcohol and (d) in ether. Those most commonly employed were (a) and bi-hydrochloride dissolved in brandy, the quinine solutions were injected in dilute as well as concentrated solution. Control observations were made on the action of acids and ether (quinine solvents) on the tissues of animals. Human muscle was examined from fatal cases of malaria or suspected malaria which had received an injection of quinine at periods varying from one hour to three months from the time of inoculation. The chemical estimations of residual quinine were undertaken by Captain FERREY, R A M C, Analytical Chemist.

The conclusions reached were as follows —

“(1) Concentrated preparations of quinine produce more intense necrosis than dilute, but dilute preparations such as are of practical utility excite oedema and necrosis at the seat of inoculation. The difference between these two methods of quinine inoculation is not of sufficient value to justify active opposition to the method commonly employed.

“Inoculation of quinine, in solutions so dilute as to avoid oedema and tissue necrosis is not of practical utility in the human subject.

“(2) A concentrated solution of quinine is absorbed rapidly from the tissues as shown by chemical analysis even in patients who are *in extremis*. It is not apparently stored as such in liver, kidneys, or heart muscle.

“(3) It is essential to realise that tissue necrosis spreading oedema and local blood destruction—are produced by the solvents employed for quinine administration and the effects are only slightly inferior to those exerted by quinine salts and the alkaloid.

“(4) No advantage was obtained by the addition of olive oil or fat or by injecting the alkaloid dissolved in alcohol, or ether, whether in concentrated or in a dilute solution.

“(5) Tissue necrosis occurs immediately and persists for a considerable period. In some instances the fibro myositis which results is associated with a fibro neuritis which causes various symptoms definitely related to the pathological processes.

“(6) Necrosis of blood vessels in the area of inoculation is a common result. This leads to small haemorrhages into the tissues, and has caused severe haemorrhages in the human subject and experimentally, from rupture of a large vessel. The destruction of the vessel wall is associated with an accompanying thrombosis.

“(7) An extensive necrosis produced by an intra muscular injection of quinine, in the neighbourhood of an important nerve trunk, may result in nerve palsy. Experimentally, complete degeneration of the great sciatic and other nerves has been produced apart from any direct injury to the nerve at the time of the inoculation. In the human subject this disastrous result may be due to spreading oedema and extensive tissue necrosis.

“(8) Experimentally, no leucocytosis has ever occurred from quinine injections, on the other hand a leucopenia may develop while an increase of large hyaline cells has been recorded on several occasions.

"(9) No essential differences in the degree of tissue necrosis from intramuscular injections of quinine in malarial fever or malarial fever associated with blackwater fever were observed

"(10) Repeated intra muscular injections of quinine should not be given into the same area of muscle, or tissue directly adjacent, as otherwise permanent injury of muscle or nerves may occur"

The account of the examination of human muscle is of special interest A few extracts are given

"A man, comatose from malaria fever, was admitted to hospital, an intra muscular injection of twenty grains of bi hydrochloride of quinine was given, but the patient died one hour later At the autopsy a large area of black green necrosis about four by four inches surrounded by gelatinous oedema was discovered at the seat of inoculation Twelve grains of bi hydrochloride of quinine were injected into the right buttock forty eight hours before death At the autopsy a large area of complete necrosis of muscle was observed together with a wide tract of haemorrhage due, as was proved on microscopical examination, to complete destruction of the wall of a large artery Two intra muscular injections of fifteen and twenty grains respectively had been made at an interval of twenty four hours and death occurred about twenty hours later The resulting lesion was similar in each case—large area of necrosis, a band of haemorrhage and congestion, with a wide tract of gelatinous oedema"

All the cases examined had received concentrated quinine The author writes—"The fact that necrosis of the tissues always accompanies the intra-muscular or subcutaneous injection of quinine is not realised sufficiently by medical officers This method should only be employed when circumstances demand it"

[This is an important paper which should be read by all actual or prospective tropical practitioners These will probably be deterred from ever giving intra-muscular quinine injections those, if they have given many hundreds without apparent harm, will continue to give them to selected cases, but assuredly with more circumspection than before For subjects who are in bad condition or desperately ill the intravenous route would appear to be the better]

A G B

COWAN (John) & STRONG (Robert H) The Treatment of Malaria —
Quarterly Jl of Med 1919 Oct Vol 13 No 49 pp 1-24
 With 1 chart

This paper is largely a résumé of the subject of which it treats but it is written in an interesting manner and the authors record their own experiences in Egypt They lay stress on the necessity of adapting the treatment to the stage of the illness and, so far as primary attacks are concerned, they are in favour of a method similar to that adopted as a routine measure in Panama, i e , gr 45 daily for a week, or for 4-5 days after the fever has subsided, followed by gr 30 for 10-12 days As regards their own practice they say —

"The initial dose lies between gr 30 and 60 daily The larger dose is rarely required The dosage should be gauged by the degree of severity of the symptoms and the mass of the infection as shown on the blood film (Gill) Gr 45 is a common dose It should be continued while the fever lasts, and for 3-7 days subsequently The dose may then be reduced to gr 30, and this should be continued until the patient has been afebrile for at least 21 days The drug may be given thrice daily after food "

For relapsing cases the line of treatment followed in India appears to them advisable, i.e., the minimum quantity of quinine which will subdue the symptoms should be administered, as an intensive quinine treatment is likely to do harm

In Egypt the commonest causes of relapse were chill, excessive exertion, digestive upsets, venereal excess, debility and coincident disease

The authors consider at some length the influence of courses of prophylactic quinine upon subsequent treatment and think that quinine prophylaxis should be avoided where possible and that when it is employed its use should be intermitted whenever the probabilities of infection are slight, so as to lessen the degree of tolerance

In short they point out that one must treat the patient, not the disease. The other matters dealt with in the paper have been frequently discussed in this *Bulletin* and do not call for special mention

A B

STEPHENS (J W W), YORKE (W), BLACKLOCK (B) & MACFIE (J W S) **Studies in the Treatment of Malaria.** xxvi **The Action of Arsenic and of Quinine on Quartan Malaria** xxvii **Intravenous Injections of Novarsenobillon and Intramuscular Injections of Quinine Bihydrochloride in Simple Tertian Malaria**—*Ann Trop Med & Parasit* 1919 July 31 Vol 13 No 2 pp 97–99, 101–108

STEPHENS (J W W), YORKE (W), BLACKLOCK (B), MACFIE (J W S) & O'FARRELL (W R) **Studies in the Treatment of Malaria** xxviii **Quinine Hydrochloride in Simple Tertian Malaria** xxix **Oral Administration of Liquor Arsenicalis Minims 30 daily for 16 Days with Quinine Bihydrochloride Grains 15 intramuscularly on the 1st and 2nd, 8th and 9th, 15th and 16th Days, in Simple Tertian Malaria** xxx **At what Time after Cessation of Quinine Treatment do Relapses occur in Simple Tertian Malaria?** (Second Communication)—*Ibid* pp 117–118, 119–124, 125–132

xxvi Novarsenobillon in a dose of 0.9 gramme intravenously causes a more rapid disappearance from the cutaneous blood of all stages of *Plasmodium vivax* than does quinine. In the same dosage novarsenobillon has no appreciable effect on the temperature and parasites in the case of infection with *P. falciparum* and *P. malariae*. Intramuscular injection of 15 grains of bihydrochloride of quinine on each of two successive days in cases of infection with *P. vivax* has a rapid effect on the temperature and the parasites. The effect of similar dosage in *P. falciparum* infections is also well defined but relapses occur more quickly than in the case of *P. vivax*. *P. malariae* is, however, little or in no way affected, though the pyrexia may be controlled.

xxvii Intravenous injections of 0.9 gramme novarsenobillon and intramuscular injections of 15 grains quinine bihydrochloride in benign tertian infections are more effective in combination than either novarsenobillon or quinine alone.

xxviii Quinine hydrochloride (20 grains on the first day, 30 grains on the second and 10 grains on the third, i.e., a total of 60 grains) administered by the mouth proved of no value in the treatment of simple tertian malaria.

XXIX The authors admit that it is not possible to form a definite estimate of the value of the above treatment, as almost half of the cases were insufficiently observed after cessation of the treatment

XXX Observations on 800 cases with 582 relapses made under conditions existing in a Military Hospital in England and continued for 60 days after cessation of treatment by quinine show that in any treatment the majority of relapses occur during the first thirty days of the observation period By 'relapse' is meant a parasitic relapse, febrile or non-febrile, i.e., parasites have appeared in the blood after a negative period induced by treatment Relapses diminish in number as time goes on and a prognostication of the probable number of future relapses can be made under three headings, (1) in reference to the relapses themselves, (2) in reference to the total cases treated, and (3) in reference to remainders This is shown by means of tables and graphs from which it would appear —

a 'That if in any treatment we know the number of relapses which have occurred in the first twenty days after cessation of treatment, then we can predict the total number of relapses in the second and third twenty days, e.g., if eighty three relapses have occurred in the first twenty days, then only thirteen or fourteen will occur in the second twenty days, and two or three in the third twenty days, and none or one in the fourth twenty days

b That if in any treatment we know the percentage of cases treated which relapse in the first twenty days after the cessation of treatment, then we can predict the incidence of relapses in the second and third twenty days, e.g., if 60 per cent of the total cases treated relapse in the first twenty days, then about 10 per cent of the total cases treated will relapse in the second twenty days, about 2 per cent of the total cases treated in the third twenty days, and about 0.2 per cent in the fourth twenty days

c That if in any treatment we know the percentage of cases treated which relapse in the first twenty days, then we can predict the percentage of the remainder that will relapse in the second, third and fourth twenty days, e.g., if 60 per cent relapse in the first twenty days then about 26 per cent of the remainder will relapse in the second, 7 to 8 per cent of the remainder in the third, and about 1 per cent of the remainder in the fourth twenty day period'

A B

FIRKET (Jean) *Sur le traitement des paludéens en Belgique* — *Arch Méd Belges* 1919 June Vol 72 No 6 pp 660-679

This lengthy paper discusses the treatment of malaria but adds little to our knowledge of the subject The treatment advocated is that carried out by NOLF in the Hospital Cabour during the war (1) In recently infected cases it consists of 6 grammes (about 92 grains) of quinine in 3 days, given as 4 cachets of 50 centigrammes (about 7½ grains) in each 24 hours by the mouth A rest of 2 days is followed by a repetition of the course Six series of such doses and rests are given, so that for one month's treatment 36 grammes (about 550 grains) of quinine are administered The author claims for this method that it is well borne and absolutely efficacious (2) In chronic cases quinine is exhibited as for primary attacks, but a 3-day interval is left free from quinine treatment, on the second day of which is given an intravenous injection of from 30 to 45 or even 60 centigrammes (4½ to 6½ or even 9 grains) of novarsan after it has been ascertained that the patient is

neither unduly susceptible to arsenic nor a syphilitic subject. A course lasts for 36 days, when 10 to 20 days' rest is enforced before commencing a second instalment. Examinations of the blood, temperature, state of the spleen and general condition are made during the treatment. If the patient cannot tolerate quinine by the mouth it may be given intramuscularly in the gluteal region or even intravenously, the usual precautions being observed.

A B

WORNFR (Hans) **Zur Behandlung der Malaria mit Darmkomplikationen** [Treatment of Malaria with Intestinal Complications]—*Therap Monatshefte* 1919 Aug Vol 33 No 8 pp 287-291

The author has carried out a series of observations on the amount of quinine present in the stools of malaria cases. In some of these the intestines were healthy. In many dysentery was present either in an acute or chronic form and a few suffered from other pathological conditions. The technique employed is fully detailed and the results are tabulated.

The conclusions reached are summarized as follows —

1 In malaria with profuse faeculent stools which seem to be derived solely from a disordered small intestine an increase in the excretion of quinine by the bowel can occasionally be recognized. In such cases intravenous injection of quinine is to be preferred to the intramuscular owing to the fact that it is a less severe form of medication and acts more rapidly.

2 Dysentery cases in which lesions of the large intestine preponderate do not excrete a larger quantity of quinine than those in which the large bowel is healthy. In malaria thus complicated oral administration of quinine is indicated.

3 The excretion of quinine in the stools ends after three or four days both in the case of the dysenteric and of the healthy bowel.

A B.

DUPERIE (R) **Note sur le traitement de paludisme secondaire** — *Gaz hebdomadaire des Sciences Médicales de Bordeaux* 1919 May 25 Vol 40 No 10 pp 113-116

This paper is the result of 18 months' observations made in a malaria centre. Experience during the war has demonstrated that massive doses of quinine are the only efficacious method of administration. Treatment with two grammes (about 30 grains) of quinine daily is advocated and at the Bètharram hospital the bihydrochloride was regularly employed, one gramme in solution being given by the mouth twice daily for 3 days in succession. Four days' rest then intervened and thereafter another course of quinine commenced, the series being continued for 6 weeks, in which time 36 grammes of quinine have been taken. Quinine in combination with arsenic is considered to be the best therapeutic agent for anaemia of malarial origin, and arrhenal [methyl arsenate of soda] 0.2 to 0.4 centigrammes daily is advised until a total of 4 grammes has been administered. It may be given by intramuscular injection, but as the salt is difficult to render sterile oral administration during the 4 days' rest is preferable. The daily dose is two tablespoonfuls of a solution of 2 grammes of arrhenal in 300 cc.

of distilled water One such course of quinine and arrhenal has been found sufficient for a complete cure

In 217 cases so treated only 3·7 per cent had fever during the course, half suffering from benign tertian and the other half from malignant infections During a period of from 15 days to 2 months' observation subsequent to the course of treatment 75·6 per cent had no recurrence, which is considered a satisfactory proportion after a single course An attempt to improve the above results consisted in administering quinine at the periods when young schizonts might be expected to appear and carrying out this treatment for a longer time than the original method adopted

This method was decided upon because it was found that in most cases both during the course and after it, the malarial attacks occurred at seven-day intervals In one of the cases suffering from *P. falciparum* infection the interval between attacks was 14 days There was thus evident a regular rhythm of which it was determined to take advantage in the manner indicated

Arrhenal was given in addition, as previously described, up to a total of 4 grammes The results appeared to be somewhat better

Should a relapse occur a fresh course of quinine and arrhenal is indicated, the total arrhenal administered being reduced to 2 instead of 4 grammes Critical seasons during which relapses of malaria are more frequent occur in hot countries and the same holds good for France, where March, April and May and August and September are periods during which special observation of malarial subjects is indicated During the intervals between these seasons it is advisable to prescribe some tonic treatment such as a pill or tablet consisting of

Liquid extract of quinine	} — 0·5 centigrammes
Quinine in powder	

Four such pills in 24 hours (two with each meal) every 7 or 15 days for two days in succession is the method recommended

The opinion is expressed that 3 years is none too long to keep malarial subjects under observation, though in a temperate climate there is a tendency for the disease to die out spontaneously

The question of quinine treatment producing blackwater fever is mentioned and the author observed its occurrence in less than 1 per cent of his cases treated as described All, however, recovered though the resulting anaemia and debility were very marked In all cases in which haemoglobinuria was observed the infection was of the malignant variety and the condition appeared during one of the critical seasons above mentioned

A B

MAYNE (Bruce) Popularizing a Quinine Formula for the Treatment of Malarial Fever With Comment by Henry R. CARTER — *Jl Amer Med Assoc* 1919 Oct 11 Vol 73 No 15 pp 1119-1121

The author suggests a standardization of treatment which aims at —

- “(1) The relief of the patient—the elimination of clinical symptoms,
- (2) the destruction of plasmodia in the peripheral circulation tending

toward the prevention of the formation of sexual parasites, (3) the prevention of the production of quinine inaccessible parasites (so called resistant or quinine fast forms), and (4) the effectual inhibition of the recurrence of clinical symptoms accompanying relapse with the reinvasion of asexual parasites."

It is designed solely for the majority of acute forms without peculiar atypical symptoms and is to be administered under medical control. Eight hundred grains of quinine bisulphate are to be taken in a minimum of 75 days according to the following routine —

(1) *Forty grains daily for five days*—Ten-gram doses of quinine bisulphate 4 times daily, at the conclusion of which only young rings and mature gametocytes should be present in the blood

(2) *Twenty grains daily for ten days*—About the middle of this stage the patient will probably be out of bed and apparently in normal health. Only gametocytes will be present in the peripheral blood

(3) *Ten grains for twenty days*, combined with arsenic or other tonic as indicated. The patient should be able to resume normal activities. Only gametocytes demonstrable in the blood

(4) *Five grains for forty days*, with tonics if indicated. An additional two weeks' treatment or more should be urged. Microscopic examination should show only rapidly disappearing or disintegrating gametocytes which are pathologically negligible

If the idiosyncrasy of the patient does not admit of 40 grains daily the dose may be reduced after the second day to 30 grains daily. The duration of treatment is apparently the minimum required to prevent relapses

CARTER in commenting on the above method endorses the need for standardization and is in general agreement with the details. He considers, however, that any such scheme should not be recommended by the Public Health Service, U S A., in view of the lack of knowledge as regards its curative effects and as to how it compares with other methods of administration

A B

ROLL (H F) & REITLER (R) *Beitrage zur Therapie der Malaria*
[The Treatment of Malaria]—*Wien Klin Woch* 1919 Sept 18
Vol 32 No 38 pp 934-936

This paper deals with the cure of the malarial attack. The authors believe that they have developed a new method of treatment by giving what they call a massive dose of quinine at a certain definite period, which they describe as being the time when the temperature has fallen 1° below the acme of the febrile attack. The average dose which they then administer is 2 grammes and this is continued in the case of benign tertian infection for a couple of days. As a result they find that the expected fresh attack does not occur. In severe cases after the temperature has fallen to subnormal they continue the quinine for 4 or 5 days in daily doses of from 1 to 1.5 gm given in the morning. There is nothing really new in their observations and they appear to have confined themselves almost entirely to the study of German literature on the subject. It may be noted that they do not believe in provocative treatment, preferring to abide by the ancient dictum *Medicus non magister sed minister naturae*

A B

MAYER (Martin) Ueber die Wirkung von Methylenblau bei Malaria quartana [The Action of Methylene Blue on Quartan Malaria] *Deut Med Woch* 1919 Sept 18 Vol 45 No 38 pp 1052-1053

A record of three cases of quartan infection, all showing gametocytes and in each of which methylene blue exerted a specific action

The drug was given five times daily in doses of 0.2 gramme at 2-hourly intervals, this daily dose being continued for 7 days. After a 2 days' interval, methylene blue was given for another 3 days as before, then discontinued for 3 days, then exhibited once more for 3 days, and so forth on the lines of Nocht's fractional treatment with quinine

Both parasites and fever speedily disappeared under this treatment

A B

CREMONESE (Guido) Di alcuni preparati mercuriali nella cura e nella immunizzazione dalla malaria [Mercurial Preparations in the Cure of and Immunization against Malaria]—*Malarologia* 1918 Dec 31 Ser 2 Vol 4 No 5-6 pp 118-130 With 1 plate

A preliminary note on this subject by Dr Cremonese was summarized in this *Bulletin* (Vol 13 p 84). The author states that he has observed that syphilitics prove, as a rule, refractory to malaria though living in a malarial zone and in close relation with malarial patients. He was at first inclined to believe in a biological antagonism between the two diseases but was led, on further reflection, to ascribe the relative immunity of syphilitics to the saturation of the system with mercury of which they are the subjects. Actual trial of mercurial salts in the treatment of malaria confirmed him in this view and induced him to formulate his theory in the following terms and to ask for further investigation of the matter by colleagues practising in malarial districts—"Salts of mercury are curative in malaria, they act cumulatively and remain in the organism for a considerable time and hence they have also immunizing power." Dr Cremonese states that on putting his views before Prof GRASSI the latter declared that he had himself noticed the immunity of syphilitics but had supposed it to be due to their immunity from mosquito bites due, in its turn, to the presence of mercury in their blood. The evidence of a direct curative action of mercury however, if accepted as reliable, points to a relation between the drug and the malarial parasite itself. The author administers mercury either by daily injections of 1 centigramme of the perchloride or in the form of pills containing a similar quantity of the bimodide. The dose is halved for children. Clinical histories of 12 cases are given in which the evidence of a curative action of mercury seems beyond doubt. It may be of interest to give one of the histories in full in translation.—

"Case V D M 17, living in Porto Nuovo. This is the most interesting case of the group and the series of blood preparations made daily is a veritable clinical history in itself. The patient is a slender girl, pale and very anaemic. She consulted me on May 18 for dental caries and mentioned incidentally (so habituated to malaria are the inhabitants of the Campagna) that she had had 3 attacks of tertian fever and was expecting a fourth that

day The spleen was enlarged Examination of the blood showed it literally swarming with rosettes of vernal tertian I gave her at once an injection of 1 centigramme in 0.25 per cent solution The attack which was impending did not come on and there has been no attack since I continued the injections for 5 days and then suspended them as there were signs of mercurial stomatitis Blood preparations gave the following results negative on the 19th, 20th, 21st, and 22nd From the 24th to the 29th, forms were found which I have always observed in persons on the point of cure, independently of the treatment adopted The suppression of the fever by the first injection shows the importance, as in the case of treatment by quinine, of attacking therapeutically in an apyretic interval, before the rigor"

The author admits that the cases described are cases of cure rather than immunization In the district in which he practises, the Campagna, it is difficult to find individuals entirely free from malaria on whom to make trials in immunization, and, as regards the few individuals found and subjected to trial, not sufficient time has yet elapsed to render possible any definite statement of results The author pleads for an extended trial of the method and, as bearing upon the question, quotes the following cases that have come under his observation —

1 A military friend, returned from Albania, stated that he had been in places where all his companions had been severely attacked by malaria and that he had remained immune This man had, 2 years previously, undergone a prolonged cure with mercury

2 A lady who had had a mercurial course came to Fiumicino, the extremely malarial district in which Dr Cremonese practises She slept with a young sister The latter was attacked by malaria, she herself remaining immune, though they were always together under identical conditions as regards infection

3 A case of aestivo autumnal fever in a non syphilitic man who had never been treated by mercury, while his wife, living with him, who had 2 years before, probably owing to an error in diagnosis, been given a prolonged course of sublimate injections remained free

F S A

LUMBAU (Salvatore) *Trattamento antimalarico (Nota preventiva)*
[Anti-malarial Treatment Preliminary Note]—*Malariaologia*
1918 Aug 31 Ser 2 Vol 4 No 3-4 p 92

The author states that he has been trying insolation of the splenic region with a view to driving gametiferous parasites from their winter and summer refuge and rendering them vulnerable to the action of quinine He states that he has obtained promising results and is continuing his observations

F S A

LIPKIN (I J) *On the Distribution and Destruction of Quinine in Animal Tissues*—*Ann Trop Med & Parasit* 1919 July 31
Vol 13 No 2 pp 149-176

This is a report to the Medical Research Committee from the Department of Bio-chemistry, University of Liverpool, it deals with a continuation of a previous investigation [see this *Bulletin*, Vol 13, p 92]

It was then shown that quinine introduced into an animal in large doses accumulates in most of the tissues at a much higher concentration

than in the blood and that the liver of rabbits, guinea-pigs, oxen and sheep rapidly attacks quinine post mortem. This paper is concerned with —

- (1) The distribution of ingested quinine in animal tissues
- (2) The power of various tissues to destroy quinine
- (3) The nature of the quinine destroying agent and the conditions favouring its activity
- (4) The substances resulting from such destruction of quinine

The summary is as follows —

"1 Evidence is given bearing on the possibility that there exist in the blood vascular system, regions kept almost free from quinine throughout a period of quinine medication

"2 The quinine content of tissues has been more extensively studied. Accumulation at much higher concentration in most tissues than in the blood is confirmed

"3 The suprarenal body is pre eminent in this respect, although not so markedly with intramuscular as with intraperitoneal injections. Fairly large accumulations may occur also in the spleen and kidney. The lymph glands contain much less quinine than the surrounding blood

"4 The liver, kidney, muscle, intestinal wall, and probably pancreas, have considerable power to destroy quinine post mortem, and, therefore, presumably during life. The blood, spleen, suprarenal bodies, bone marrow, lymphatic, salivary, and thyroid glands have little or no such power

"5 The quinine destroying agent extracted from the liver is ther molabile, inactivated at 100° C and acts best in neutral media. Its action is rapid at first, but soon falls off. It does not act at all in the absence of oxygen, and is hindered by hydrogen peroxide. It can be crudely 'purified' by fractional precipitation with alcohol

"6 Quinine is formed by the action of liver pulp on quinine

"7 Quinine given by the mouth, in ample doses to a malarial patient, was therapeutically inert. As none appeared in the urine, this is probably true also of its metabolites

"8 In the faeces of a case of blackwater fever, a brown pigment is described which, although not itself cholecyanin, readily yields this body

"9 New tests for quinine and quinotoxin are described

"10 By an improved procedure, the thalleoquin test is rendered capable of detecting easily 0.004 mgm of quinine"

A G B

SCHILLING (Cl) & BOECKER (E) Ueber die Speicherung von Chinaalkaloiden in Blutzellen [The Storing of Cinchona Alkaloids in Blood Corpuscles]—*Deut Med Woch* 1919 June 19 Vol 45. No 25 pp 682-684

As was described in this *Bulletin* (Vol 13, p 81) MORGENROTH has shown experimentally that in defibrinated blood to which quinine or optochin has been added the red cells contain the alkaloid in higher concentration than the serum, from which he concludes that probably the contained alkaloid prevents the merozoites or sporozoites of the malaria parasites from penetrating into the cell (repulsion)

The authors have repeated and confirmed his work. Instead of biological methods they used a chemical, depending on the fact that potassium mercury iodide precipitates alkaloid from watery solution in very small concentration, 1:150,000 to 1:400,000, producing a bluish opalescence, and, owing to the fact that this substance precipitates albumen also, special controls were employed

Their experiments showed that hydrochloride of quinine as well as optochin in concentration of 1 10,000 to 1 50,000 in a suspension of erythrocytes or leucocytes in physiological saline is stored in the cells, the degree in which it is so stored depending on the quotient quantity of cells

quantity of fluid Salvarsan on the other hand they found was not stored in the cells The result of one experiment led them to think that quinine resistance may depend less on resistance of the parasites than on a lessened capacity for storage on the part of the erythrocytes

They refer to an experiment of LIPPMANN LIPPMANN found that in mice deprived of leucocytes optochin failed to arrest pneumococcus septicaemia whereas in such mice infected with nagana, salvarsan killed the trypanosomes, showing that the action of optochin depended on the presence of leucocytes

A. G. B.

ROTHF (Fritz) **Ueber die sog Chiningewohnung und die Chininausscheidung in Urin bei Malaria** [The so-called Habituation to Quinine and the Excretion of Quinine in the Urine in Malaria]—*Zentralbl f d gesamte Medizin* 1919 June 28 Vol 40 No 26 pp 425-432

The author writes from an extensive experience of malaria in Turkey during the war He repeatedly observed that people without any quinine prophylaxis, in spite of living in very infected regions and certainly exposed to infection, did not become ill This is not to say that they are free of infection, for despite numerous negative thick drop preparations such cases may be carriers, the plasmodia being present in internal organs When such cases relapse they may prove resistant to all quinine treatment, at least as long as the conditions which have induced relapse persist As one of these conditions the author cites sea-sickness

In the summer of 1918 Rothe carried out a careful series of investigations on quinine excretion by the urine in order to see if proof could be obtained of quinine habituation This method of research was introduced by TEICHMANN, but the author followed the more exact technique employed by SCHITTENHELM and SCHLECHT All sources of error had to be carefully excluded, even such as might result from the patient's smoking heavily or taking tea and coffee, as in such cases evidence of an alkaloid may be found in the urine and vitiate the test for quinine As a result he found that the amount of quinine excreted increased as the cure proceeded and he also found himself in accord with SCHITTENHELM and SCHLECHT that in the case of patients previously treated either with prophylactic or curative quinine and who were more or less habituated to the drug a greater percentage of quinine was excreted than in the case of those not so habituated In the latter the excretion of quinine on the first day of the cure is on the average lower than in the habituated Curves are given showing the hourly and daily excretion of quinine both in the case of non-habituated and habituated The curves are rather instructive but the author utters a warning against too much reliance

being placed on the results, considering the state of our knowledge at present as regards quinine metabolism. It would appear, however, that as the excretion of quinine in those not habituated to the drug terminates before the lapse of 24 hours it is advisable not to adopt a form of quinine prophylaxis in which there are several quinine-free days. The author suggests that probably the best method would be to give a small daily dose of 0.3 gramme and, in addition, doses of 1-1.2 gramme, either singly or divided, twice a week, say on Wednesdays and Saturdays.

A B

GENOESE (Giovanni) *Il liquido cefalo-rachidiano nella malaria dei bambini* [The Cerebro-Spinal Fluid in the Malaria of Children]—*Pedelinco* Sez prat 1919 June 15 Vol 26 No 24 pp 737-743

The author draws attention to the frequency of involvement of the central nervous system in children suffering from malaria. He gives clinical histories of 10 cases, in all of which lumbar puncture was performed and the fluid drawn off subjected to detailed examination. His general conclusions are given as follows—

(1) During an attack of malaria in a child, especially in the graver forms, there is, in the majority of cases (8 out of 10 among my cases) more or less marked meningeal irritation and changes physical, chemical and cytological may be noticed in the cerebro spinal fluid.

(2) Albumen is almost always increased in quantity but not to the same extent as in acute meningitis.

(3) The fluid is almost always clear and under high pressure.

(4) Chlorides are increased in quantity (7.80-8.50 per cent) owing to non functioning of the renal filter during the attack.

(5) Cytological examination of the fluid reveals in many cases more or less intense lymphocytosis, rarely polynucleosis.

(6) Occasionally one may have a cellular reaction without corresponding clinical symptoms and conversely, with a complete meningeal syndrome, we may have a fluid under high pressure and containing albumen but without cellular elements.

F S A

THOMSON (J Gordon) *Complement Deviation in Malaria and the Question of the Influence of Malaria on the Wasserman Reaction*—*Trans Soc Trop Med & Hyg* 1919 June 20 Vol 13 No 2 pp 18-20

The chief purpose of these researches was (a) to make possible the diagnosis of recoveries from malaria when no parasites can be found in the peripheral blood, and to estimate the effect of treatment by quinine, and (b) to ascertain the influence of malaria on the Wassermann test as applied for the diagnosis of syphilis.

The specific antigen was prepared from cultures of the malarial parasite, the supernatant fluid being pipetted off and an excess of distilled water being added to the remaining corpuscles and parasites. Laking of the red blood cells is secured by shaking, after which repeated washings and centrifugalizing remove the haemoglobin. The resulting sediment, which consists of a mass of malarial parasites, leucocytes and

empty envelopes of red cells, is dissolved in $N_{10}NaOH$ and then neutralized with dilute HCl . This in its turn is diluted with normal saline until no anticomplementary action *per se* remains and the resulting material is used as antigen. The full technique used is detailed in this *Bulletin*, Vol 13, p 87, and the *Proceedings of the Royal Society of Medicine*, Vol XII, No 6, April-May, 1919. By using an antigen of *P vivax*, so prepared, it is possible to obtain fixation of the complement in acute and chronic cases of malaria, whether the infection is benign tertian or malignant.

Details of the various experiments carried out are given. Some cases only react to their specific antigen but there may be a group reaction as well. It is probable that double infections are commoner than hitherto suspected. As regards the efficacy of treatment it is shown that in order to render the serum negative prolonged administration of quinine is essential in most cases. As a result of the examination of 130 malarial cases by the routine standard Wassermann as employed in the Military Hospital, Rochester Row, it was established that a positive reaction is not present at any stage of malaria, provided the technique is correct.

In a discussion which followed MANSON-BAHR made the interesting suggestion that a strong and specific antigen might possibly be obtained from the oocysts in infected anophelines in the same way as FAIRLEY had extracted a powerful antigen for bilharzia from the livers of snails harbouring the cercariae of human schistosomes.

A B

ROSE (Wickliffe) **Field Experiments in Malaria Control**—*Jl Amer Med Assoc* 1919 Nov 8 Vol 73 No 19 pp 1414-1420
With 6 text figs

The writer draws attention to the great need of seriously considering the question of malaria prophylaxis throughout the world, pointing out that more than half of its 1,600,000 inhabitants live in countries where infection is prevalent and constitutes a serious menace to health and productive power. In India alone malaria kills on an average 1,130,000 persons every year and gives rise to 100,000,000 cases of illness. He notes that the cost of antimalarial measures is very great and hence a discouraging factor, and gives examples of the outlay involved, citing the Federated Malay States and the Panama Canal Zone. It is necessary for those responsible for the administration of antimalarial schemes to realize the possibilities and limitations of the various methods that can be used. The International Health Board of New York undertook four types of field experiments for the purpose of ascertaining their relative efficiency and cost under given conditions, as it is assumed that if communities are to be induced to undertake antimalarial measures they must be shown that the investment pays and that it can be carried out within limits of expenditure which they can afford. The findings are as follows—

(1) *Control by Antimosquito Measures*—The cases of Ismailia and Port Said are quoted as examples of good results with reasonable expenditure, the figures being for the first named 4s 2d per capita initial cost and 1s 8d per capita for annual upkeep, while, for the

second, satisfactory control was secured for about 5*d* per capita. The author gives details of experiments in America carried out on similar lines (a) At Crossett, S E Arkansas, a lumber town of 2,129 inhabitants situated on the edge of the so-called "uplands" in a level, low-lying region, but one providing good drainage. Climatic conditions and abundant breeding places favoured the propagation of anophelines and severe malaria was endemic, causing approximately 60 per cent of all illness in the area. A malarial survey was first undertaken, then borrow pits and ponds were filled in, streams cleared and trained, weekly oiling with road oil by knapsack sprayer or oil drips was carried out, artificial containers were removed from premises, etc. All operations were adequately supervised and all unnecessary effort eliminated, the object being to secure a reasonably high degree of mosquito control without embarking on major works.

The results may be seen from the following —

	1915	1916	1917	1918
Total physicians' calls on account of malaria	2,500	741	200	73
Per capita cost (excluding overhead cost)*	—	5/2	—	—
Total upkeep per capita	—	—	2/7½	2/2½
Percentage reduction 1915-1918, 97.1 per cent	—	—	—	—

* Overhead cost is the cost of obtaining information required for the work, and does not include expenses incurred in carrying out the operations.

(b) In 1917 Hamburg, a neighbouring town and area to Crossett, containing 1,285 inhabitants but with a worse malarial rate and more breeding places, was dealt with on much the same lines. The results are thus epitomized —

	1916	1917	1918
Total physicians' calls on account of malaria	2,312	259	59
Per capita cost (excluding overhead cost)	—	6/0½	—
Total upkeep per capita	—	—	1/10
Reduction in incidence 1916-1918, 97.4 per cent	—	—	—

(c) An experiment on a large scale was then attempted, also under a variety of conditions. Four small Arkansas towns were selected, ranging in population from 975 to 3,023. Lake Village was situated on level, low-lying soil with a two-mile lake frontage and a shallow swamp in the rear. Dermott, also in the flats of the Mississippi, had abundant anopheline breeding places throughout the municipal area. Monticello was a typical hill township on a clay soil. Bauxite, a rambling mining community of 2,500 inhabitants, comprised a large area with numerous small streams and seepage from hillsides. The plan followed at Crossett and Hamburg, but improved by the experience

gained at these places, was adopted, especial care being taken to eliminate unnecessary work. The results are tabulated as follows —

	Lake Village	Dermost	Monticello	Bauxite
Population	975	2,760	3,023	2,500
Physicians' calls for malana				
1916	1,817	1,399	1,413	862
1917	1,388	1,248	1,274	729
1918	83	162	137	172
Per cent reduction, 1917—				
1918	94.8	87.8	89.8	78.4
Per capita cost, 1918	5/2½	2/3	1/11	4/7½

(2) *Control by Screening*—One trial of this method without any other means was made. The area selected was a group of cotton plantations near Lake Village, Arkansas. Numerous anophelines were present and the malarial incidence was high. The houses were typical negro cabins, loosely constructed and accordingly difficult to screen. The work was carried out by carpenters without cost to the tenants, galvanized wire of 16 meshes to the inch being used. The inhabitants were subsequently instructed in the use of the screens and regular inspections were made. An estimate of the result was based on the parasite index. In May, 1916, when the work commenced, this was 11.97 per cent, in December of the same year after completion of the work it had fallen to 3.52 per cent, a reduction of 70.6 per cent. The inhabitants realized the benefit of the screening. The average cost per house was about £3, and, estimating renewals every two years, the average annual cost would be £1.10s. On this basis the annual cost per capita for screening alone was 7s. 3½d.

(3) *Control by Immunizing Quinine*. This was carried out under the direct supervision of the physician in charge of another plantation community. Five grains of quinine [salt and method of administration not stated] twice daily for two successive days each week were given to everyone in the area. For children under 15 years, 1 grain for each 3 years was administered in the same way. From a parasite index taken in May, 1916, at the commencement and one in December of the same year a reduction of 64.45 per cent was apparent. The per capita cost, excluding overhead expenses, was 2s. 4½d.

(4) *Control by Treating Carriers*. (a) An initial experiment in Bolivar County, Miss., 1916-1917, involving a population of 30,000. It is stated that the test established the fact that 10 grains of quinine per day for 8 weeks sterilized the blood of about 90 per cent of the carriers to whom it was administered. This standard course of treatment was adopted and a further attempt was made in 1918 by (b) Test Demonstration in Sunflower County, Miss. [see Reviews of Bass's papers in this *Bulletin*, Vol 14, No 5 pp 294-296], an area of about 100 square miles with a population of about 1,000 urban (living in

Ruleville) and 8,000 rural on cotton plantations. In Ruleville anti-mosquito measures were chiefly adopted, but in the rural districts carriers were given the above sterilizing treatment. The results obtained were as follows. No malaria or trouble from mosquitoes occurred in Ruleville during the year. Approximately an 80 per cent decrease in malaria within the rural district. Physicians reported a marked decline in malaria cases and plantation owners and managers agreed that this was the case. House to house visits and inspections showed 87.5 per cent reduction of malaria in the case of the first 10 families observed in a community of small landed proprietors. The author points out that this demonstration has only just been commenced and that no conclusions will be attempted until the tests have been carried on over a period of years within the same area. The outlook, however, is promising and moreover the methods adopted, if used intelligently, are a sound business investment.

[The importance of considering the financial side of anti-malarial work appears to justify the lengthy review accorded this important paper, which is illustrated by graphs. It is, however, doubtful if 'physicians' calls' for malaria can be taken as an entirely sound basis on which to form conclusions regarding the value of the work accomplished*]

A B

Bass (C C) Studies on Malaria Control I The Relative Frequency of Malaria in Different Ages and Age Groups in a Large Area of Great Prevalence—*Southern Med J* 1919 Aug Vol 12 No 8 pp 456-460 With 6 Charts

These observations are based upon a survey made during 1916 and 1917 of all persons of all ages living in an area of 328 square miles in Bolivar County, Mississippi, i.e., one of the most intensely malarious sections in the United States. A careful history as to whether attacks of malaria had occurred during the previous twelve months was obtained, and blood from 31,459 persons living in the area was examined by the thick drop method.

The results are summarized as follows —

"1 In an area of 328 square miles in Bolivar County, Mississippi, during 1916 and 1917, blood examination of all people living in this area showed that malaria parasites are present in 23.56 per cent of persons under 20 years of age as compared with 19.22 per cent of persons over 20 years of age.

"2 The highest five year period is from 5 to 9, inclusive.

"3 Negroes were found to have 36.61 per cent more infection than whites and the high point is reached with negro children much earlier than with white children.

"4 Approximately 50 per cent of all the malaria in the locality investigated was found in persons under 20 years of age."

A B

* The same paper with illustrations of anti mosquito operations appears in the Fifth Annual Report for 1918, International Health Board, U S A , pp 124-138

BASS (C C) Studies on Malaria Control VI The Frequency of Malaria Infection Without Recognized Symptoms, compared with the Frequency of Recognized Attacks in an Area of Great Prevalence VII The Proportionate Dose of Quinin required to obtain the same Results in Treating Malaria in Children of Different Ages as in Adults VIII Some Observations Indicating that Effective Immunity against Malaria Parasite Infection does not Occur—*Southern Med J* 1919 August Vol 12 No 8 pp 460-462 With 2 figs 462-465 With 3 charts 465-467. With 1 chart

VI The investigation was carried out on the same 31,459 persons in Bolivar County and during the same periods 1916-1917 as detailed in paper No 1

The conclusions are as follows —

In the particular locality examined "where 40 30 per cent of all the people give a history of having one or more recognized attacks of malaria during a year, and where at least 21 18 per cent have malaria parasites in their blood, 55 09 per cent of all the malaria demonstrated by blood examination is in persons who have had recognized attacks of malaria and that 44 91 per cent either does not produce any symptoms whatever or at least does not produce symptoms that are recognized as malaria

"History of attacks alone can not be depended upon to indicate the presence of malaria infection It indicates only 55 09 per cent of the existing infection

"Attention is called to the fact that in a group of people where malaria is as prevalent as in the locality under consideration, at least 15 93 per cent of those who give negative histories as to present or recent recognized symptoms of malaria, have parasites in their blood

"It should also be noted that because of the fact that malaria infection may be present without producing recognized symptoms of disease finding parasites in the blood may lead to a diagnosis of malaria and to overlooking other important conditions"

TABLE I—Summary of Examination of 31,459 Persons for Malaria Bolivar County, Mississippi, 1916 and 1917

History + (attacks during past twelve months)	40 30 per cent
Blood + (parasites found in blood)	21 18 " "
History+, blood +	28 96 " "
History—, blood +	15 93 " "
Blood +, history+	55 09 " "
Blood +, history—	44 91 " "

VII The author points out that there is great variation in the dosage of quinine used and the method of administration, and that perhaps this is more in evidence in the treatment of children than adults The directions given for dosage in the case of children are frequently indefinite An impression prevails that children stand quinine better than adults do

The object of this paper is to call attention to certain observations which seem to indicate the proper proportionate dosage for children Of those suffering from malaria amongst the same 31,459 persons in Bolivar County, different groups were placed upon different methods of treatment, but in all, the dose for children as compared with adults was always in the same proportion, namely, 1/20 of the adult dose for each year of age Altogether 9,818 persons were on quinine treatment, and were re examined after the treatment was completed and the percentage of cures obtained in the people of different ages was

noted The tabulation was based upon blood examinations only and the results indicate the effectiveness of the treatment in disinfecting infected persons and do not necessarily indicate its effectiveness in controlling clinical symptoms, though it is presumed that such is the case

The conclusions are as follows —

"All the infected persons in a large area in Bolivar County, Mississippi, were treated with quinine, the proportionate doses for children being 1/20 that of the adult dose for each year of age

"Re examination of 9,818 persons was made and the results of the treatment in the different ages were ascertained It was found that a larger per cent of the adults were disinfecting than of the children

"From the data obtained, the necessary calculation was made to determine the proportionate doses that would be required for each age, to produce the same effect as the corresponding adult dose does This was found and is expressed in Table I and in Chart I It is contrasted with the proportionate doses indicated by Young's rule in Chart II and by Cowling's rule in Chart III "

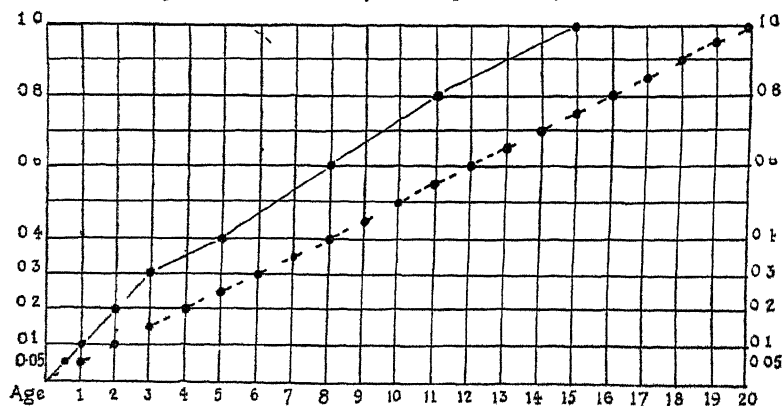
TABLE I —Proportionate Dose of Quinine required to produce equal Results in Children and Adults

Age	Proportion of Adult Dose	Dose When Adult Dose is 10 Gr
Under 1	0 05	$\frac{1}{2}$ grain
1	0 1	1 "
2	0 2	2 grains
3 and 4	0 3	3 "
5, 6 and 7	0 4	4 "
8, 9 and 10	0 6	6 "
11, 12, 13 and 14	0 8	8 "
15 or over	1 0	10 "

VIII The object of this section of the paper is to demonstrate that effective and lasting immunity in malaria does not take place, Investigations have shown that agglutinins, lysin, a complement-binding substance and opsonins all occur during and following malaria attacks but their combined efforts, though demonstrable, are not sufficient to disinfect the individual rapidly, at least in many cases It usually happens that malaria relapses from time to time for many months and often for years before the infection is finally eliminated

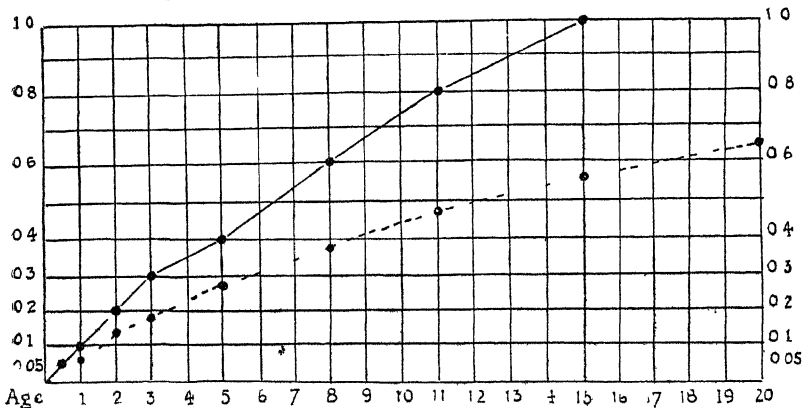
Chart I Proportionate doses employed in the experiment

Proportionate doses required to produce equal results



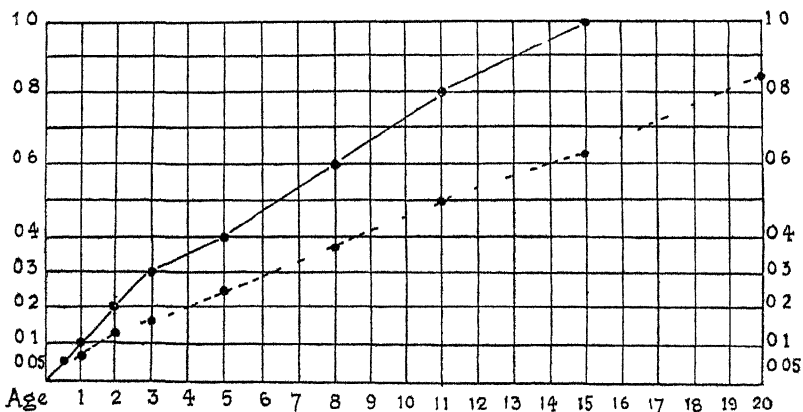
A careful history of recent attacks of malaria was taken and a blood examination was made in the case of over 30,000 persons, which showed that approximately 50 per cent of the population in Bolivar and Sunflower Counties have malaria once or more often during each year. Furthermore, study of a large group of persons in Sunflower County in 1918 showed that 50 to 68 per cent of malaria cases occurring there during a given year are relapses and not fresh infections. If immunity were fairly rapid and lasting it is evident that a very few years would

Chart 2 Proportionate doses required to produce equal results —
Proportionate doses indicated by Young's rule



Young's Rule—For children under 12 years, the doses of most medicines must be diminished in the proportion of the age increased by twelve, thus at 2 years of age to $\frac{2}{2+12} = \frac{1}{7}$. At 21 the full dose may be given.

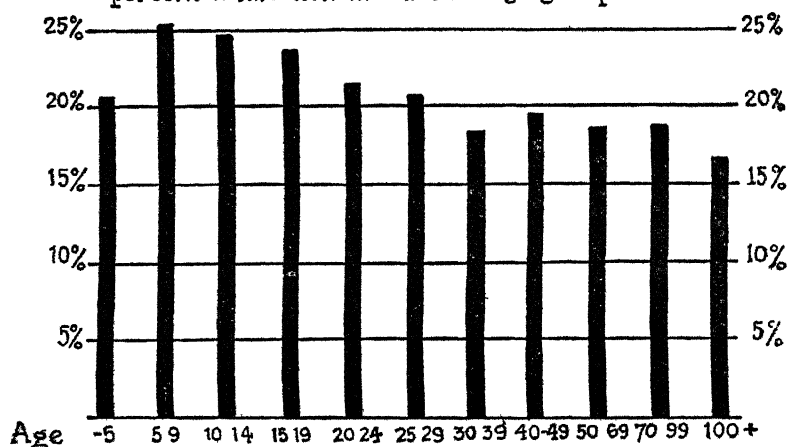
Chart 3 Proportionate doses required to produce equal results —
Proportionate doses indicated by Cowling's rule ---



Cowling's Rule—The dosage for children may be calculated by taking the age of the child as the numerator and 24 as the denominator. According to this the dose for a child approaching 4 years of age would be $\frac{4}{24} = \frac{1}{6}$ of the dose for an adult.

immunize the whole population except for a few young children. Studies by KOCH in West Africa confirmed by STEPHENS and CHRISTOPHERS in West Africa and JAMES in India showed that practically no malaria occurred in older children and adults, but that nearly all very young children had the infection. PANSF in East Africa found 15.3 per cent of infection in adults against 88 per cent in children of one year and 89.2 per cent in children of three years of age. Later investigations, however, have demonstrated that the much greater prevalence of malaria in children ascertained by KOCH and other observers was entirely overestimated and that in countries where malaria prevails to a great extent many adults have it as well as children.

Chart 4 Blood examination of 31459 persons showing percent of infection in different age groups



The author's summary is as follows —

"Immune bodies are produced in malaria and the immunity processes contribute largely to elimination of the infection. In fact, they are usually sufficient to eliminate the infection in time without the aid of specific medication.

"In any given locality where malaria is very prevalent, if it were followed by lasting and effective immunity, there should be little malaria in older children and adults. In a locality where approximately 50 per cent of the community have malaria during a given year, it is observed that malaria occurs about three fourths as frequently in adults as in children. This observation indicates that whatever immunity is produced is not lasting and effective against new infection."

A B

COVINGTON (P. W.) **Control of Malaria** — *Texas State Jl Med* 1919
July Vol 15 No 3 pp 124-126

The author, who directs the Bureau of Rural Sanitation of the Texas State Board of Health, refers to the extensive prevalence of malaria in Texas and considers the four chief control measures which can be adopted, i.e., sterilization of carriers on the lines recommended by BASS,

screening, quinine prophylaxis, and anti-mosquito measures. He describes what has been done in Arkansas on the lines of the last three measures and asserts that by properly carrying out any one of the four methods a substantial reduction in malaria may be secured.

A B

LE PRINCE (J. A.) **Control of Malaria** — *Southern Med J* 1919 Aug Vol 12 No 8 pp 469-471

A paper read before the Alabama State Medical Association, Fifty-second Annual Session, Mobile, April 15, 1919. The author pays a tribute to one great quality possessed by General GORGAS, namely, persistency and facing cheerfully what may appear at first an impossible situation. He goes on to give some account of anti malarial work carried out in America in connection with the late war. He points out that the American nation is paying annually 100,000,000 dollars for the privilege of having chills and fever, and calls upon counties which have not already responded to combine in malaria eradication, a work which advances trade and prosperity wherever seriously undertaken.

A similar paper by the same author was read before the Mississippi State Medical Association at Hattiesburg, Miss., in May, 1919.

A B

BARBIEPI (Antonio) **El problema de saneamiento antimalárico en la Argentina. Consideraciones y antecedentes** — *An. del Depart. Nac. Hig.* Buenos Aires 1919 March-April Vol 25 No 2 pp 21-37

This paper on anti-malarial sanitation in the Argentine contains nothing new from the standpoint of the general reader. It applies the experience gained in Italy, Panama and Ismailia to the problems in the rural districts of the South American State and enters at some length into the financial aspect of the campaign.

The question of the provision of drinking water is in some parts of Argentina intimately bound up with anti-mosquito work while, like other countries, the Argentine has suffered on account of the numerous borrow-pits left by railway engineers which, when full of water, constitute ideal anopheline breeding places.

The author points out that in determining the localities most suitable for treatment the three points to be considered are the sickness rate due to malaria, the density of the population and the industrial economic value of the region under consideration, and classifies certain provinces and their divisions in accordance with the first two factors.

Mechanical protection and oiling measures are considered and special stress is laid on replacing by good houses the insanitary huts and hovels tenanted by the poorer classes.

A B

ROSS (Ronald) **Malaria Reduction in Cyprus** [Correspondence] — *Brit Med J* 1919 Aug 16 pp 220-221

This communication draws attention to the Annual Medical Report from Cyprus for 1918 and to the satisfactory state of that island as regards malaria consequent upon continued and intelligent work on

the lines suggested by Sir Ronald Ross in 1913. The total number of cases under treatment has fallen from 10,035 in 1912 to 2,414 in 1918. The average spleen rate in children, which was 17.2 in 1913, has shown a steady diminution to 5.1 in 1918. For district and rural dispensaries the figures have progressively lessened from 7,312 in 1913 to 2,205 in 1918. Ross fears that this sanitary victory will probably not bring to the workers any reward or recognition of their services.

A B

MUEHLENS (P) *Verhütung und Bekämpfung der Malaria in Felde und in der Heimat* [The Prevention and Control of Malaria in the Field and at Home]—*Deut Med Woch* 1919 Sept 25 Vol 45 No 39 pp 1072-1075

In this paper Muehlens reviews the prophylaxis of malaria under active service conditions and amongst the civil community. He considers the treatment of parasite carriers, quinine prophylaxis, mechanical protection against mosquitoes and general anti-mosquito operations of all kinds. There is nothing new in his remarks but he draws interesting illustrations from his experiences with the Bulgarian army in Macedonia. He admits the comparative failure of quinine prophylaxis in the field in countries where malaria is very prevalent but does not consider it entirely superfluous even where anti-mosquito measures are employed.

A B

JOB (E) & HIRTSMANN (L) *La Quinothérapie préventive dans les Armées en campagne*—*Bull et Mém Soc Méd Hôpnt de Paris* 1919 Oct 23 Vol 35 No 28 pp 817-821

The authors deal with the vexed question of quinine prophylaxis, taking the wise standpoint that the dosage employed should bear a relationship to the intensity of infection. In Algeria small doses of $\frac{1}{2}$ gramme (about 4 grains) of quinine or even less [daily presumably, though this is not stated] gave excellent results. This method however was of practically no value in Macedonia where frequent and massive infection was the rule, a fact which had previously been demonstrated in certain areas in Morocco.

The antagonists of quinine prophylaxis hold that its administration serves only to mask initial attacks and that in consequence these remain virtually untreated with the result that the disease becomes chronic in character, and consequently considerably less amenable to cure. The authors do not consider this aspect as justifiable, and in view of the fact that preventive quininization diminishes considerably the number of pernicious attacks and of fatal results they are in its favour. Although prophylactic quinine may mask primary attacks its administration is of value to troops on service conditions in spite of the chronic cases that arise. Primary attacks are liable to occur as explosions, thus possibly incapacitating the bulk of a force subject to infection, whereas secondary malaria has not this characteristic and accordingly is not likely to cripple so large a number of troops at the same time.

The cold weather months, when malaria is not contracted, should be utilized in a combined effort by all medical personnel (regimental surgeons, bacteriologists and sanitarians) to treat those affected by quinine administration. By whatever method prophylactic quinine is administered, and the authors prefer a continued moderate dosage of 40 to 50 centigrammes (6 to 8 grains approximately) daily, it is essential that supervision is exercised, which is a simple matter, as the Tanret reaction serves as a reliable test

A B

GOSSE (A. H.) **A Note on Prophylactic Quinine in Malaria**—*Lancet* 1919 Sept 6 pp 431-432

In this paper the author's experience of satisfactory prophylactic quinine, given in daily 5-grain doses in liquid form to (1) a small post of about 30 men and (2) seven nursing sisters in Mesopotamia is contrasted with the unfavourable results recorded from other war areas, e.g., Salonika. Those who took the prophylactic quinine escaped attacks of malaria while a considerable proportion of other members of the communities who refused to do so, and were accordingly observed as controls, fell victims. It is suggested that the infection in Mesopotamia was not of so gross a nature as in Salonika, and that the dosage of prophylactic quinine might with advantage be adjusted to correspond with the probable infecting dose of malarial organisms. A stage, however, may be reached when the amount of infection is so excessive that no reasonable dosage of prophylactic quinine would be protective. Looked at in this light the value of prophylactic quinine varies inversely as the dose of infecting sporozoites, and the practical point arises as to the possibility of mosquito surveys (determining the numbers of infected insects) being employed as a guide to the requisite dosage of prophylactic quinine for given localities

A B

- i WRIGHT (E. Hasell) Report on the Prevalence of Malaria and Anopheline Mosquitoes and Measures recommended for the Prevention of Malaria in Mercara—*Indian Med Gaz* 1919 Oct Vol 54 No 10 pp 361-365
- ii VERDLIET (Louis) Paludisme et traumatisme—*Caducée* 1919 Sept 1 Vol 19 No 9 p 119
- iii REI/LAU (Karl) Ein Fall von Malariainfektion in Berlin [Case of Malaria Infection in Berlin]—*Med Klin* 1919 Sept 21 Vol 15 No 38 p 948
- iv TAYLOR (R. V.) Note on the Treatment of Malaria—*China Med J* 1919 Sept Vol 33 No 5 pp 455-456
- v SANDILANDS (J. E.) Prophylactic Quinine in Malaria [Correspondence]—*Lancet* 1919 Sept 20 p 547

i This is a paper on familiar lines which possesses only a local interest. It is illustrated by a coloured plan. Mercara, it may be said, is in the Coorg Province of Southern India and adjoins Mysore.

[The author advocates the planting of eucalyptus trees in marshes for drying the soil, but it is generally found that they do more harm than good by affording shelter to anophelines. In Italy their cultivation was abandoned on this account.]

ii This is one of the numerous warnings now being uttered by surgeons to surgeons as regards the danger of operations lighting up latent malaria.

It is illustrated by two cases, in one of which attacks of fever followed a hysterectomy for fibroma, while in the other and more recent case the

author was able by previously administering quinine to perform without any untoward effects a large plastic operation on a man who had previously suffered from malaria

iii An account of a case of primary benign tertian malaria in a man who had never been away from Berlin or its immediate surroundings. The author discusses the localities in which infection might have been acquired and incidentally mentions that *Anopheles maculipennis* has been found in Berlin

iv This paper is merely a resume of an address by Piss and of one of his papers. His views have already been recorded in this *Bulletin* [Vol 11 p 87, and pp 294-296]

v The writer describes his domestic troubles while in Aden, which were really due to the fact that both he and his native servant were suffering from malaria. The malaria and domestic disturbances both disappeared on the taking of 5 grains of quinine daily by master and man

A B

i OPTA (Francesco) Bonifica di Cavo Spina e Malaria [Malaria and the Drainage of the Cavo Spina]—*Malariaologia* 1918 Dec 31 Vol 11 No 5-6 pp 111-116 with 1 map

ii OVAZZA (Vittorio Emanuele) Sulla lotta contro la malaria [The Fight against Malaria]—*Malariaologia* 1918 Dec 31 Vol 11 No 5-6 pp 131-134

i An account of suggested works for draining the Cavo Spina, a low lying tract of ground on the left bank of the river Reno not far from Bologna

ii A plea for systematic quininisation in malarial zones, for the establishment of hospitals exclusively for children suffering from malaria, and for compulsory notification and isolation

F S A

MEDICAL ZOOLOGY

CUTLEP (D W) & WILLIAMSON (R) A Note on the Protozoa of the Intestine—*Jl Roy Army Med Corps* 1919 Sept Vol 33 No 3 pp 262-266

In the course of 14 months the authors made routine examination of the faeces of 153 "dysentery convalescents," and they here say something of the result of their observations. In every case a purge was given overnight, and the faeces were examined within a few hours of being collected.

Dealing with such material the authors observe of *E coli* that included bacteria are rare, and of *E histolytica* that vacuoles are uncommon, that the nucleus is not visible, and that the nuclei of its cysts are not seen unless stained. They speak of 8 partite schizogony as an ordinary verifiable phenomenon of *E. coli*, though it is not clear that they actually observed it.

The authors are confident in the power of a half-per cent solution of neutral red in saline to furnish a criterion for *E histolytica* and *coli*—the former is stained, the latter is not or not sufficiently to cause misgiving.

[The authors are doubtless prepared for controversy on all these points]

A Alcock

CROPPER (J W) Note on a New Counting Chamber for the Enumeration of Protozoan and other Organisms [Marcus Beck Laboratory Reports No 7]—*Proc Roy Soc Med* 1918 Vol 11 pp 1-12

The scale of the Thoma Zeiss haemocytometer is so small that where the Protozoa to be counted are scanty none may happen to fall upon it. Larger scales have therefore been designed by the author to meet this insufficiency.

The author extemporises a "protozoometer" as follows—With a diamond, an ordinary microscope slide (or better, a slide about half again the ordinary width) is ruled, parallel to its long axis, in lines $\frac{1}{8}$ millim apart. A space in middle of the ruled area is then ringed with paraffin wax. The inside diameter of the ring should be an inch or more so that at least 20 cmm of the emulsion to be examined can spread without impinging on the wax. The depth of the ringed enclosure can be modified by suitable manipulation of the wax. The annexed figures show the design.

The author reserves the name "protozoometer" for a more elaborate scale which must be made by an optician. Here the area to be ruled is ground in a broad slide to a uniform depth of $\frac{1}{10}$ millim. In this excavation a square area of 25 sq millim is ruled in both dimensions.

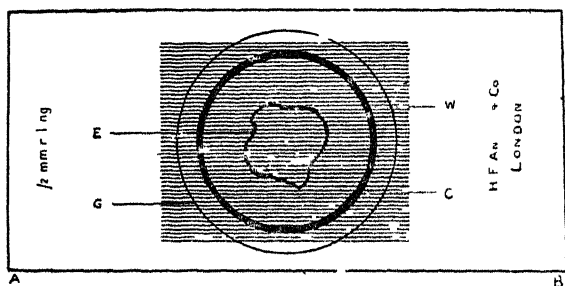


Fig 1 Diagram to illustrate the Ruled Slide and Wax Ring Method for the enumeration of protozoa and other organisms with a low power AB, slide, C, ruled columns $\frac{1}{2}$ mm wide, W, wax ring, E, emulsion (20 c mm), G, cover glass (Drawn to scale natural size)

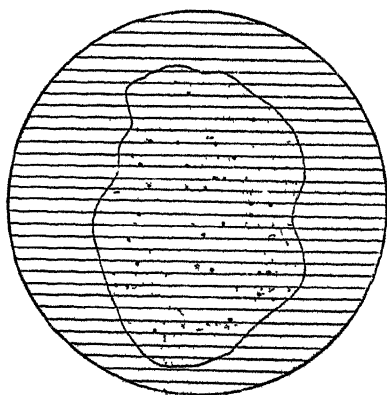


Fig 2 To illustrate the distribution of *E. coli* cysts in 20 c mm of a 5 per cent saline emulsion of stool Forty three cysts present—43,000 per gramme (*Del ad nat*)

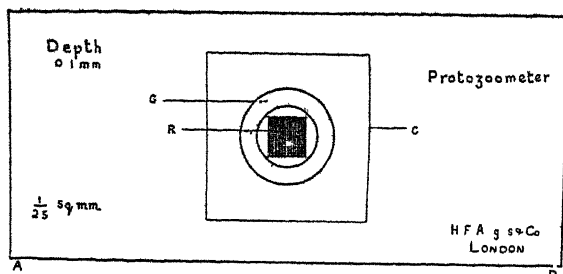


Fig 3 Diagram to illustrate the dimensions of the ruling of the new Counting Chamber ("Protozoometer") AB, slide, R, ruled area, G, groove for overflow, C, cover glass (Drawn to scale natural size)

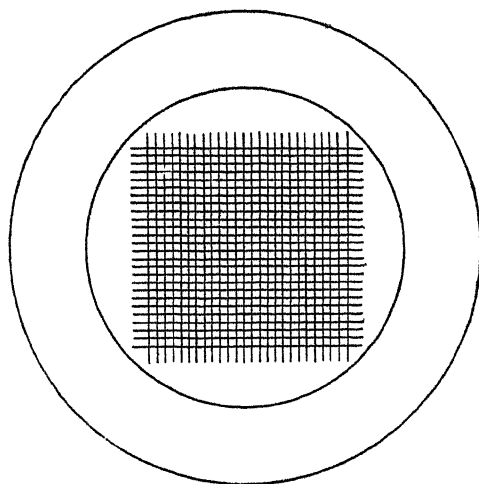


Fig 4 To illustrate the ruling of the platform of the new Counting Chamber
Area of large square, 25 sq mm, small squares, $\frac{1}{25}$ sq mm (Drawn to scale, $\times 5$)

[Figs 1 to 4 are reproduced by permission from the *Proc Roy Soc Med*]

at intervals of $\frac{1}{5}$ millim, so as to give a convenient scale of 625 small squares each having an area of $\frac{1}{25}$ sq millim, as is shown in the subjoined figures

A A

VELU (H) *La Coccidiose de la chèvre au Maroc et le parasitisme latent de Eimeria Arloingi*—*Bull Soc Path Exot* 1919 June 11 Vol 12 No 6 pp 298-301

The author's observations of an extensive outbreak of coccidiosis in a herd of goats lead to the conclusion that the Coccidium *Eimeria arloingi* Marotel is gravely pathogenic to the young kid, but is only a persistent and quite inert infection of the adult goat. As the contamination is spread by faeces the adult goats, in which the infection is thus persistent, are the "latent carriers" of the disease.

The author states that *Eimeria zurni* is in the same way a latent infection of bovines.

A A

SHEATHER (A. L.) *A Malarial Parasite in the Blood of a Buffalo*—*Agricultural Research Institute Pusa Bull* No 90 1919 Calcutta Supt Govt Printing India [Price As 6 or 7d.]

This interesting paper and the plate that illustrates it furnish material that cannot but give rise to reflection.

The parasite was found in the blood of a domestic buffalo that died in the course of being prepared and utilized as a "serum-maker."

The coloured plate of illustrations, which was made from stained smears taken after death, shows a double infection with a *Plasmodium* that enlarges the infected red cells. Three forms of the parasite are described and figured, and also among the forms figured is at least one

that has much resemblance to a gametocyte. The young forms of the parasite are small coarse rings. The grown forms show melanin of a brownish hue in rods. The sporulating forms show 7 or twice seven merozoites and a small excentric melanin mass. Some of the grown forms are shown and described as extracorporeal.

The specific name *P. bubalis* is suggested if the parasite should prove to be new.

[It is to be hoped that further search may be made for this interesting parasite.]

A A

LEGER (Marcel) *Hémogregarine et Plasmodium du Tupinambis nigropunctatus*—*Bull Soc Path Exot* 1919 May 14 Vol 12 No 5 pp 217-220

Tupinambis nigropunctatus is a common lizard of Cayenne.

Its *Haemogregarina*, which is considered to be a new species and is designated *H. salimbenni*, is described. The new species is compared with and differentiated from other local Iacertilian *Haemogregarines*.

The *Plasmodium* of *Tupinambis nigropunctatus* approximates to *P. carini* of *Iguana nudicollis*. The youngest forms, round or slightly oval with a well defined margin, have a diameter of 1μ , the nucleus is vacuolate and comparatively large. The largest forms, which are ovoid with one end sharper than the other, are 5μ by 3μ in diameter, the nucleus, with a distinct vacuole, is compacted of granules of chromatin. Proliferating forms, which are not quite so large, show three or four masses of chromatin. Melanin granules have been seen only in the proliferating forms. Gametocytes have not been observed either in the blood or in the organs. The parasitised red blood cells very rarely show "paranuclear corpuscles."

A A

LIGNIÈRES (J) *Piroplasmes, Anaplasmes et Grains chromatiques*—*Bull Soc Path Exot* 1919 Oct 8 Vol 12 No 8 pp 558-566

This paper sustains three predications (1) That in anaemia, either naturally caused or experimentally produced, there may be found, in the red cells, chromatoid granules which in all physical and histochemical characters resemble Anaplasma, but are inert when inoculated and confer no specific immunity. (2) That Piroplasma parasites either in drawn blood, or taken from an animal after its death, may—particularly if kept at a temperature of 5° to 8°C —contract to forms extremely similar to Anaplasma, which, however, show their own specific characters when inoculated and on the other hand confer nothing but their own specific immunity. (3) That *Anaplasma marginale* and *Anaplasma bigemnum* are specific entities not to be confounded with either of the above phenomena. These true Anaplasmata, in their pathonomy, do not cause the haemoglobinuria so common in piroplasmosis and do not protect against Piroplasmal infection.

As regards relative virulence, *Anaplasma argentinum* is more formidable than *Piroplasma argentinum* and even more than *Piroplasma bigemnum*.

A. A.

PINTO (Cesar F) *Sobre a presença do Balantidium Coli* (Malmsten, 1857) em indivíduos nao apresentando phenomenos dysentericos — *Brazil Medico* 1919 July 12 Vol 33 No 28 pp 217-218

After a brief review of the observations and opinion of other writers the author refers to his own experience and gives a summary of 11 cases, ranging in age from 1 to 58 years, where *Balantidium coli* was found in the faeces without any show of dysentery. In every one of the 11 cases both *Necator americanus* and *Ascaris lumbricoides* were concomitant, in 4 of them both *Trichocephalus trichurus* and *Oxyuris vermicularis* also, in 5 of them *Trichocephalus* but not *Oxyuris* and in 2 *Oxyuris* but not *Trichocephalus*.

[It may, perhaps, help to throw some faint glimmer on the pathonomy of *Balantidium* to mention here—since it seems not to be generally known—that both *Balantidium* and the nearakin *Nyctotherus*, which (along with certain other Protozoa) one usually regarded as harmless necessary parasites of the everyday classroom frog, may, in frogs suffering from enteritis stuff themselves with red blood cells. The frogs in which this unusual phenomenon was observed by the reviewer came from a garden in Acton, where a frog-plague (i.e., a true “epibatrachic,” not a plague of frogs) had been raging.]

A A

LAVERAN (A) & FRANCHINI (G) *Au sujet de l'Herpetomonas ctenocephali de la puce du chien et de sa culture.*—*Bull Soc Pa'h Exot* 1919 June 11 Vol 12 No 6 pp 310-313 With 2 figs

The authors' technique for the culture of the *Herpetomonas* of the dog flea (*Ctenocephalus canis*) is as follows.—The insect is ethered, washed in 7 or 8 changes of normal saline, and dissected in citrated saline, all by sterile rite. If the flagellates are observed in the dissected gut, the contents of the gut in the citrated saline are pipetted into one or two tubes of simplified Novy medium recently prepared. These are kept at a temperature of 24°-25° C, and if the operation is successful, a fine culture of the flagellates, showing round, oval, crescentic, and flagellar forms may be found on the 4th day.

Herpetomonas ctenocephali differs from *H. ctenopsyllae* in having a far longer flagellum.

A propos to this paper E. CHARTON stated that he also had cultivated *Leptomonas* (*Herpetomonas*) of dog-fleas (*Ctenocephalus*) taken from a dog that was known to be immune to kala azar, and had found in the culture curious large, flagellar, spiral (*tordu en helice*) forms exactly like *Leptomonas davidi* Lafont. These curious forms were constant, and they deserve to be noticed as being in signal contrast to anything found in cultures of *Leishmania infantum* and *L. tropica*, and as thus disposing of PATTON's suggestion that canine kala azar is an infection due to *Herpetomonas ctenocephali*.

A. A

LAVERAN (A) & FRANCHINI (G) Infection des souris blanches à l'aide des cultures de *Herpetomonas ctenocephali*—*Bull Soc Path Exot* 1919 July 9 Vol 12 No 7 pp 379-383 With 3 figs

The authors having already established the fact that mice can be infected with *Herpetomonas ctenocephali* by inoculation with the contents of the gut of infected dog-fleas, describe in the present paper how the infection may be transmitted to mice by injection of pure cultures of this flagellate of the dog-flea

Eight mice were so inoculated, once to thrice, in the peritoneum. No results were noticed in 2 cases, short and mild infection followed in 4, and serious or fatal infection in 2. The issue in these last 2 is described in some detail, and may be summarised as follows—At an interval of 4 to 22 days after inoculation parasites were detected in the blood, both in a free state and intracorpuseular, these parasites were Leishmania-like, but larger, their increase was associated with increasing anaemia and weakness, which in one case ended fatally on the 24th day, the other case being sacrificed in an advanced stage on the 26th day. Parasites similar to those observed in the living blood were found after death in the liver and spleen, both free and intracellular, in one case they were also found in the bone-marrow. Cultures from the infected blood gave rise at intervals of 8 to 20 days to abundant Leishmania-like, *Herpetomonas*-like, and intermediate forms

A A

LAVERAN (A) & FRANCHINI (G) Sur quelques Flagellés d'Insectes obtenus en culture pure et en particulier sur *Crithidia melophagi*—*C R Acad Sci* 1919 July Vol 169 No 4 pp 153-155

The *Crithidia* of the "sheep-tick," *Melophagus ovinus*, is not so easy to cultivate as the *Herpetomonas* of the rat-flea and dog-flea, owing to the abundant admixture of bacteria in the gut of the fly

The authors' procedure, after washing the fly (*Melophagus*) 5 or 6 times in sterilised saline solution, is to dissect out the gut in a few drops of citrated saline. If flagellates are found to be numerous in the contents of the gut, and bacteria not very abundant, the material is pipetted into tubes of simplified Novy medium to which 2 to 5 drops of a sterile one per cent solution of carbonate of soda has been added. The tubes are plugged and kept at laboratory temperature, or in an incubator at 24° C. By this procedure the authors have obtained from the 3rd to 4th day a pure culture of *Crithidia melophaga** twice out of five times

In such cultures the organism assumes the following forms—

(1) Small spheres of 3 to 9 microns diameter, or more frequently small ovoids from 5 to 10 microns in major diameter, with nucleus and "centrosome," some dividing, with 2 nuclei and centrosomes, an exceptional few also with a flagellum of 20 to 25 microns

(2) Larger *Crithidia* forms (like those occurring normally in the fly's gut) 10 to 25 microns in length, with the free part of the flagellum short. These are sometimes in rosettes with the flagellar ends central

*This is the original and usually accepted name of the flagellate, see FLU, *Archiv f Protistenkunde* 1908, Vol 12, p 153—[Ed]

(3) *Herpetomonas* forms of 10 to 20 microns with 1 flagellum some times short and never exceeding 15 microns Rosettes are common

(4) Cysts, regularly ovoid, 6 to 8 microns in the major axis, with the nucleus at the smaller end These are usually found in staling cultures

Six young white rats were inoculated from such cultures Four are still living in good estate, but two showed pathological effects which were verified *post mortem* Parasites both intracorpuseular and free were found in their blood, they got weak and very anaemic, and their breathing became very quick, and when they were killed 9 and 12 days after the respective inoculation, leishmania-like parasites were present in the blood, and also in the spleen of one and in the liver and spleen of the other, both these organs being enlarged

A A

BOYD (Mark F) **Observations upon *Trichomonas Intestinalis* in vitro**—*Jl Parasit* 1919 March Vol 5 No 3 pp 132-136 With 1 plate

In continuation of previous experiments for the cultivation of *Trichomonas in vitro* the author has endeavoured to bring about development of the parasite in subculture It was found that faecal suspensions which were strongly acid or in which the fluid above the sediment was darkly stained with bile were unsatisfactory On the other hand suspensions which were neutral to litmus and which were only faintly yellow gave good results In the subcultures growth was not marked till after 48 hours Even in cultures where many free parasites developed after a time the flagellates soon became fewer in number, being replaced by small rounded bodies which the writer believes are the cysts of the parasite Attempts to infect two rats from the subcultures were not successful

F W O'Connor

SEITZ (A) **Ueber die klinische Bewertung der *Trichomonas-Kolpitis***—*Muench Med Woch* 1919 July 25 Vol 66 No 30 pp 837-839

From a review of existing knowledge on the subject the author concludes that in pregnant woman with the vaginal secretion increased and altered the presence of *Trichomonas vaginalis* is not to be regarded as harmless it, at any rate, indicates an increase of other micro-organisms which possess a relative pathological importance Pregnant women suffering from colpitis are therefore particularly predisposed to puerperal infection

A A

HAUGHWOUT (Frank G) and de LEON (Walfride) **On the Ingestion of Erythrocytes by *Pentatrichomonas* sp, found in a Case of Dysentery**—*Philippine Jl Sci* 1919 Feb Vol 14 No 2 pp 207-218 With 1 plate

A report in great detail of a case where in a dysenteric stool numerous individuals of a *Pentatrichomonas* were found to have ingested red blood cells In the course of examination of several preparations of the stool 103 such individuals were seen, and in one instance a flagellate was actually observed engulfing a red blood cell

The patient who furnished the stool—a girl of six years—was admitted for acute dysentery, and passed stools of a dysenteric character after admission. The stools revealed *Ascaris* and *Trichuris* infestation, but no *Entamoebae* could be found by three observers, nor was the dysentery bacillus found in a stool which, however, was not perfectly fresh.

Bacteria were not detected in any of the flagellates, and the variation in size of the ingested corpuscles suggested that they were being assimilated.

The paper is nicely illustrated

A A

CHAMBERS (Albert J.) & PERKOLA (Waldo) *Diploecomonas Soudanensis*—*J Trop Med & Hyg* 1919 Oct 15 Vol 22 No 20 p 190

The generic name *Diceicomonas* under which the authors described this flagellate [see this *Bulletin* Vol 13, p 350] being preoccupied, the authors now substitute *Diploecomonas* as the new generic appellation.

A A

FRANÇA (C) *L'insecte transmetteur de Leptomonas Davidi* (Note préliminaire)—*Bull Soc Path Exot* 1919 Oct 8 Vol 12 No 8 pp 513-514

Having never found this bug infected, and having never even seen it on the Euphorbia, the author concluded that *Stenocephalus agilis* was not the intermediary host of the Euphorbia flagellate. This year, however, he has found the *Stenocephalus* infected by a *Leptomonas* having all the characters of *L. davidi*, all the infected bugs having come from a spot where there was a high percentage of infected Euphorbias.

In the body cavity of many of the bugs there was found a parasitic larva of a Muscid fly, and these larvae also were infected.

The most remarkable phenomena in the infected bugs are (1) the presence of small strong walled cysts in the proboscis and (2) the existence of small non-flagellar forms in the salivary glands. By experiment these non-flagellar forms were found to appear 8 days after the infective feed.

A A.

INGRAM (A) *The Domestic Breeding Mosquitos of the Northern Territories of the Gold Coast*—*Bull Entom Res* 1919 Nov Vol 10 No 1 pp 47-58 With 1 map in text

This excellent paper records the observations made in a 3 months' tour (3rd May to 2nd August) undertaken primarily to ascertain the prevalence of *Stegomyia fasciata*. The season was unusually dry, the halts were short—generally less than 24 hours, and the difficulties of keeping larvae and pupae alive and getting them to hatch out while on the march must have been most disheartening. 44 villages and towns in the Northern Territories of the Gold Coast were visited, and samples of their mosquito larvae were taken from 42. The trees in the compounds of European Rest Houses were also examined for likely holes

Larvae of *Stegomyia fasciata* were found in 34 villages. Larvae of *Culex duttoni* in 35, of *C. decens* in 23, of *C. tigripes* in 21, of *Culicomyia nebulosa* in 21, of *Stegomyia vittata* (= *sugens*) in 20, of *Anopheles costalis* in 4, and of *Culex invidiosus* in 3.

Larvae of *S. fasciata* and *S. vittata* (= *sugens*) were frequently found together usually in clear water, such as the small earthenware pots and calabashes used for watering fowls. Those of *Culex duttoni* had a predilection for the water in pots that had been used for native beer (*peto*) which has a very persistent sour odour. Those of *Culex decens* and *Culicomyia nebulosa* were generally found in utensils containing foul water, often with *C. duttoni* and *C. tigripes*, and sometimes with *S. fasciata*. Those of *Culex tigripes* were found in vessels containing either fresh or foul water.

It was noted that *Stegomyia vittata* is not exclusively a "domestic" breeder, enormous numbers of its larvae being discovered in shallow pools far from the haunts of men. Larvae of *Culicomyia nebulosa* also were occasionally found in pools in the distant bush. Other species found in the bush, but not in domestic utensils, were *Culex ager* var. *ethiopicus* (in swamp pools) and *Anopheles metoriensis* (in rock pools along with *Stegomyia vittata*). *Culex invidiosus* also, rare in domestic utensils, was quite common in swampy pools in the bush.

The investigation of rot-holes in trees was not fruitful, perhaps because of the abnormal drought. The debris of holes was removed and treated for the possibility of resistant eggs—e.g., of *Stegomyia fasciata*—but without result. The trees most susceptible to such rot were *Poinciana regia* (the Flamboyant, the Gold Mor tree of Anglo-India), wild fig, mango, silk-cotton-tree, Dawa-dawa (*Parkia biglobosa*), and tamarind.

Phlebotomus was found in most of the Rest Houses. *Culicoides* was in evidence at several places. Larvae and pupae of *Forcipomyia ingrami* were found in the moist debris of a rot hole in a Poinciana.

A A

JOHNSON (W B). Domestic Mosquitos of the Northern Provinces of Nigeria.—*Bull Entom Res* 1919 July Vol 9 No 4 pp 325-332

This paper is a model of well-maintained achievement and is intrinsically of great importance. The author during six years' service in Northern Nigeria has caught and examined all the mosquitoes he could find in his own bungalows, and he records here the analysis of his captures of 11,514 individual insects. This onerous business was carried on at Kaduna, Katagum, and Zungeru, as a daily prelude to the responsible routine of a medical officer.

The author points out that at all these stations anti-mosquito measures of an inexpensive kind—such as screening water-tanks, piercing gutters, clearing grass and bush—were energetically enforced under expert supervision and prospective punishment of negligence, so that his results give a useful index of the limitations, no less than the benefits, of this kind of anti-mosquito work. He also points out that the mosquito-larvae found in a station by no means correspond specifically with the adult mosquitoes caught in domiciles, and he draws the inference that a "mosquito survey" of larvae is misleading.

[which may be true enough, without contradicting the proposition that a general survey of Anopheles breeding places is everywhere one of the fundamental operations of anti-malaria campaigns]

Of the total number of mosquitoes (11,514) caught and examined by the author in his bungalows 10,215, or 88.7 per cent were Anopheles, 1,277 or 11.1 per cent were Culex and allied genera, and 22, or 0.2 per cent belonged to the Stegomyia group

These figures must be regarded 'with one auspicious and one dropping eye' for though they show good sanitary work in the stations themselves they give a dreadful picture of natural surroundings that lie immediately outside the medical officer's domain

Of the total number (10,215) of *Anopheles* the specific percentages were *A. costalis* 54, *funestus* 38.6, *rufipes* 5.5, *pretoriensis* 0.5, *phaiocensis* 0.4, *flavicoستا* 0.35, *domicolus* 0.25, *mauritanus* 0.05, *nili* 0.03, and *squamosus* 0.02

Of the total number (1,277) of *Culex* the specific percentages were *Culex decens* 76.4, *invidiosus* 12.4, *duttoni* 3.2, *tigrisipes* 2, *ager* 1.3, *fatigans* 0.16, *grahani* 0.16, *quasigelidus* 0.16, *Culexomyia nebulosa* 2.8, and *Mansonia uniformis* 1.4

The total number (22) of "Stegomyias" was made up of 21 individuals of *S. fasciata* and 1 *Ochlerotatus ochraceus*

As regards seasonal incidence, it was lowest in the cold season, with a minimum in January, and highest in the rainy season, with a maximum in October

The author is to be congratulated upon a most assiduous and most useful piece of work which should be collated with a similar valuable record of the "Domestic mosquitos of Accra" by Drs J. E. SCOTT MACFIE and A. INGRAM which appeared in the *Bulletin of Entomological Research* for 1916 (Vol 7 pp 161-177). These authors also comment on the remarkable discordance between a survey of larvae and a survey of domiciliary adults [See this *Bulletin* Vol 9 p 101]

A A

INGRAM (A) & MACFIE (J. W. S.) The Early Stages of West African Mosquitoes IV—*Bull. Entom. Res.* 1919 Nov Vol 10 No 1 pp 59-69 With 7 text figs

In this paper are described the pupae of *Anopheles pretoriensis* and *rufipes*, *Ochlerotatus hirsutus* and *nigeriensis*, *Culex ager* var *ethiopicus* and *Culex quasigelidus*, and the larva of *Culex univittatus*

For the specific diagnosis of pupae the authors attach particular importance to the features of the paddles, of the regularly disposed hairs on the abdominal terga, and of the breathing trumpets

A A

SWELLENGREBEL (N. H.) & SWELLENGREBEL-DE GRAAF Description of the Anopheline Larvae of Netherlands India, so far as they are known till now—*Meded. Burgerlijk Geneesk. Dienst in Nederl.-Indië* 1919 Vol 6 pp 1-47 With 16 figs 23 plates and 15 photographs

A very elaborate account, including descriptions in great detail, figures, diagrams, tables, and characters and photographs of breeding-places of the Anopheline larvae of Netherlands India

In addition to two unidentified species the larvae so carefully handled are *Anopheles aikeni*, *aconitus* and a variety, *punctulatus*, *leucosphyrus*, *minimus*, two varieties of *rossi*, *indefinitus*, *ludlowi*, *umbrosus*, *albotaenatus*, *sinensis*, *barbuiostrius* and a variety *pallidus*, *fuliginosus*, *maculatus*, and *karwan*

A A

SWELLENGREBEL (N H) **Eenige voor Nederl-Indie nieuwe Anophelen**—*Geneesk. Tydschr. v. Nederl-Indie* 1919 Vol 59 No 1 pp 1-12 With 1 plate

The author's "*Myzorhynchus*" *argyropus* is stated to be synonymous with *M. mauritanus* Grandpre

"*Myzorhynchus*" *barbuiostrius* var *pallidus* is a new variety smaller than the typical form and having a larger pale area at the tip of the wing-fringe, its larva also differs from the typical form in having external clypeal hairs like those of *umbrosus*

"*Myzomyia*" *flava* is a new species characterised by its yellow colour and unspotted wings

A useful dichotomous key for identification of all the *Anopheles* species of Netherlands India is given

A A

KOITSUMI (T) [**Anopheles Mosquitoes in Formosa**]—*Taiwan Iga-kkar Zasshi* (*Jl. of the Formosa Med. Soc.*) 1917 Aug 28 Oct 28 Nos 178 & 180 pp 497-518 & 657-660 [From Review by R G Mills]

The author notes that the species identified in Formosa by KINOSHITA and HANETONI with *Anopheles willmori* is really *A. maculatus*, also that the species identified by HATORI with *A. ludlowi* should be distinguished as a variety—*formosensis* [The features of the variety—slight differences in the spotting of the wings—appear to be rather vague]

A A

ROUBAUD (E) **Antagonisme du bétail et de l'homme dans la nutrition sanguine de l'*Anopheles maculipennis*** Le rôle antipaludique du bétail domestique—*C. R. Acad. Sci.* 1919 Sept 8 Vol 169 No 10 pp 483-486

The author is of opinion that, in France, domestic animals (pigs, oxen, horses, goats, sheep, rabbits, and dogs, in that order of importance) play an antimalarial part of the first rank in diverting *Anopheles* mosquitoes from human habitations, and he thinks that this is the explanation of the beneficial effect of agriculture on the hygiene of malarial tracts

A A

METZ (C W) **Observations on the Food of *Anopheles* Larvae**—*U.S. Public Health Rep.* 1919 Aug 8 Vol 34 No 32 pp 1783-1791

It has been variously stated that *Anopheles* larvae live on green algae, or on minute animal life, or on small aquatic life of all kinds.

both animal and vegetable, or that they feed indiscriminately on all kinds of organic matter alive or dead. The author, having observed prolific breeding of *A. crucians* in a large swamp contaminated with chemicals and containing little or nothing in the way of nutriment but the dead leaves that fell into it, here describes in detail a series of experiments which show that larvae, not only of *A. crucians* but also of *quadrimaculatus* and *punctipennis*, can thrive and complete their final destiny, without check, in water that contains nothing but dead vegetable tissue.

He points out that larvae merely left in water full of rotting vegetation soon die [as do most active aquatic animals], but his experiments ensured proper aeration and fresh changes or renewals of water containing the pabulum, and in most of the experiments there is sufficient evidence that the conditions excluded the access of bacteria and infusoria. Of the different kinds of sterilized vegetable matter tried as food *Chara* alone was found unsuitable.

A A

PETIT (G) & TOURNAIRE (P) Sur la répartition des gîtes d'*Anopheles* dans l'arrondissement de Bergerac (Dordogne) — *Bull Soc Path Exot* 1919 June 11 Vol 12 No 6 pp 332-339

The authors' survey leads to the generalisation that *Anopheles maculipennis* though having a preference for clean water with aquatic vegetation is often found in dirty stagnant water, and even in water polluted with sewage, along with *Culex* larvae, but that *A. bifurcatus*, even if occasionally found in company with *A. maculipennis*, is exclusively an inhabitant of clear, cold, shaded waters.

A A

MACGREGOR (M E) On the Occurrence of *Stegomyia Fasciata* in a Hole in a Beech Tree in Epping Forest — *Bull Entom Res* 1919 Nov Vol 10 No 1 p 91

The hole in question is a nidus of the larvae of *Anopheles plumbeus*, and has also given issue to *Ochlerotatus geniculatus* and *Orithopodomyia albionensis*. It is well known to the author, whose custom it has been to collect larvae from the hole and breed them out in his laboratory at Sandwich. Among the issue of one such collection were two males of *Stegomyia fasciata*, of normal size. The collection was made, and was followed out, under the personal supervision of the author who is satisfied that there is no element of error.

A A

FEYTAUD (J) & GENDRE (E) Sur la résistance des larves de Culicides dans les eaux piquées — *Bull Soc Path Exot* 1919 May 14 Vol 12 No 5 pp 231-234

Having observed an abundant fauna, including numerous Culicid larvae, in waters fouled and discoloured by the waste of a melinite factory, the authors deliberately tested the resistance of larvae of *Anopheles bifurcatus* and *maculipennis* and *Culex pipiens* and *annulatus* to solutions of picric acid. They found—as would be expected—that larvae can be gradually inured to solutions of a strength that they could not otherwise tolerate.

Using a standard saturated solution of picric acid, they found that larvae of *A. maculipennis* appeared to be little inconvenienced by a dilution of 1/500 of the standard solution, and that larvae of the two species of *Culex* lived for several days in a dilution of 1/50 of the standard solution

The authors note that the larvae of *A. maculipennis* taken from the contaminated water of the melinite factory were undersized

A A

DELMERGE (James A) **Some Practical Notes on the Prevention of Mosquito Breeding**—*Jl Trop Med & Hyg* 1919 Oct 1 Vol 22 No 19 pp 181-184 With 7 figs.

The author describes his anti-mosquito work in Macedonia chiefly during the summer of 1918, and the following selections from his experiences may prove generally useful to officers in sanitary charge of large camps

In cutting surface-drains turning back the sod along the edges of the drain for at least a foot saves frequent obstruction by grass. Large stones near the edges keep the drains from being trodden and broken by men and animals. Spraying the edges of drains with dilute cresol keeps down vegetation

Streams running in beds of sand broken by rocks are best diverted altogether, as also are those running through small marshes. Stagnating streams in flat land are best converted into a chain of deep clean-cut pools, which can be kept clean and cresolised. Ponds for watering horses, etc., should be made not by damming a stream, but by cutting a clean deepish basin in one side of the channel. All bushes and overhanging branches on the banks of streams should be cut back so as to give a broad free gangway on either side

Where an oil film is blown aside by winds or disturbed by frogs a solution of cresol is the preferable larvicide—1 in 100,000 in standing water, 1-1,000 in slow streams. Wells can be cresolised without spoiling the water for animals and vegetable gardens. For small pools the solution is simply stirred in with sticks. For ponds, boards steadied by a keel and held by drag ropes can be pulled forwards and backwards, in streams the solution can be spread down the current with a brush. Cresol is no good for drip-cans, and the Vermorel sprayer did not give satisfaction to the author

Covers for wells, etc., can be made of sacking stretched on a wooden frame, but light wooden covers well caulked are the best. Corrugated iron was found to be very unsatisfactory

For clearing, short handled bill hooks are the best. [Nothing can beat the Gurkha *Kooli* with its short haft and heavy well-poised blade]

Decoy pools can be made very efficacious

A A

HENRY (Arnold K) **Destruction of Mosquito Larvae in Streams: a Thorough and Economic Method**—*Lancet* 1919 May 24 pp 908-909

The author recognizes that in dealing with *Anopheles* larvae in streams not only must vegetation be cleared away but also the spreading

waters must be bounded in a smooth unbroken channel, and that for the latter purpose the best makeshift is plain mud

To economise kerosene oil he recommends treating a stream in successive sections of 15 to 20 yards. The first section is formed by two "surface dams," each made of a plank set on edge athwart the channel and dipping 2 or 3 inches into the water, $\frac{1}{4}$ to $\frac{1}{2}$ a pint of oil is then poured on from the upper dam, and is very thoroughly swept over the surface of the enclosed water with a brush. Another section is then dammed with a third plank downstream, is flooded with oil from the first section by removal of the intervening plank, and is treated in the same way with the brush, and so on and on down stream, the original oil doing duty over and over again, its inevitable gradual loss being made good from time to time. The author states that 1,166 yards of a stream six feet broad, of which only about 166 yards had been cleaned or canalised, was thus effectively treated within 16 pints of oil. He also states that the edge of large sheets of water may be oiled in the same economical way with brush and plank, the latter being held so as to prevent the oil from running abroad. All oiling, of course, is periodically repeated.

The author makes no mention of larvae being alarmed by the brush, and diving for safety after the Anopheles fashion, so that it is to be presumed that the streams treated with such success were extremely shallow

A A

DARNALL (William Edgar) **New Jersey's Work in Mosquito Control —**
Jl Amer Med Assoc 1919 Sept 6 Vol 73 No 10 pp
737-742 With 7 figs

Much of the area under control in New Jersey is littoral marsh of vast extent, but the less dangerous inland tracks are also strictly regulated—the whole territory being divided *ad hoc* into counties or districts.

The county or district administrative unit is a sextvirate with a Superintendent or Chief Inspector and his Assistant, Local Inspectors, and trained gangs of workers as the executive. The Superintendent in addition to possessing executive capacity must be an "Expert mosquito man."

The *coastal marsh* is drained by surface ditches about 100 feet apart, which ultimately are open to the sea and so are under tidal influence. At ebb tide the land between the ditches drains dry, and with the flood millions of small "Killfish" run up to feed. The ditches are cut by machines each of which is under a foreman and five hands and often can cut 500 feet of ditch 10 by 30 inches in 15 minutes. Every part is under constant patrol.

Inland, under the same pattern of administration, etc., each local Inspector has charge of an Urban district, which in the mosquito season he must cover every ten days. Every property in the district as inspected is reported on a separate card, which must be a pink card if any breeding is detected.

The source of mischief is treated immediately. If it be stagnant water it is drained, or, if drainage be not feasible oiled, and the oiling squad must parade for duty every ten days.

A. A

ROYER (B F) & EMERSON (C A) **Mosquito Eradication in South-eastern Pennsylvania**—*Amer Jl Public Health* 1919 May Vol 9 No 5 pp

The operations here described had for their aim the reclaiming from mosquitoes of a vast extent of marsh, lying for the most part below highwater-mark, along the Delaware River. Reclamation works were already in existence but had got out of repair. Under the authors' supervision dikes were heightened and strengthened, sluiceways and pumping stations were erected, many miles of drainage channels were dredged and deepened, and many new main and lateral ditches were cut through marsh.

While these operations for drying the tract were in progress a comprehensive system of oiling was carried on. Stations with storage tanks of 500 to 1,000 gallons capacity were established, whence oil was distributed in motors to the nearest accessible spots, and thence carried by hand to the gangs working in the marshes. A training-school for inspectors was installed, and each trained man was placed in charge of a district every part of which was inspected once in ten days, spots where larvae were found and places where existing drainage was faulty being flagged for immediate attention. At the same time nightly collections of adult mosquitoes were made in order to check the results of the attack on larvae.

The work also included oiling of all water used in industry, and cleaning and oiling street ditches within the area. The result of the operations is that complaints about mosquitoes became almost unknown and that preparations are being made for the cultivation of large areas of land which for years had been possessed merely by things gross and rank in nature.

A list of the mosquitoes of the district is given, which includes *Anopheles punctipennis* and *quadrimaculatus*. The predominant mosquito during early summer was *Aedes sylvestris*, and after July 1st *Culex pipiens*.

A A

LUDLOW (C S) **One Phase of the Mosquito Work connected with the Army Camps in 1918**—*New Orleans Med & Surg Jl* 1919 Sept Vol 72 No 3 pp 139-144 also *Milit Surgeon* 1919 Sept Vol 45 No 3 pp 313-318

The authoress as a medical entomologist of long-established reputation here ably supports the recognised proposition that the basis of applied entomology is comprehensive and authentic collections, and she describes the procedure followed by the Army Sanitary Administration in obtaining collections of mosquitoes from camps and cantonments in the United States in 1918.

A A

HILDEBRAND (Samuel F) **Fishes in Relation to Mosquito Control in Ponds**—*Public Health Rep* 1919 May 23 Vol 34 No 21 pp 1113-1128 With 21 figs

This paper gives in full detail the results of an investigation of the value of certain fishes for extinguishing mosquito larvae in a given

area containing numerous ponds which it was not feasible or desirable to drain or to treat with oil. The observations lean chiefly on *Gambusia affinis*, a species of the small, hardy, prolific, and mainly viviparous fishes that constitute the largish family *Cyprinodontidae*—a family represented in fresh or brackish waters all round the globe in warm latitudes.

As regards *Gambusia affinis*, it was found to be of great value in the conditions specified, not requiring protection from larger rapacious fishes if there were shallows where it could find refuge, heartily destroying mosquito larvae in water free from debris and slightly submerged vegetation where larvae were hidden, and intelligently attaching itself to the workmen who raked away this sheltering vegetation. "they soon became quite tame, and schools of them work almost under the tools of the labourers." Occasionally, however, larvae were found in water so chemically befouled that fish could not live in it.

Experiments were made with some other species of fishes, but most of these are mentioned only by their vernacular names.

A A

GRAHAM-SMITH (G S) Further Observations on the Habits and Parasites of Common Flies—*Parasitology* 1919 Oct Vol 11 No 3 & 4 pp 347-384 With 2 charts, 2 plates and 23 text-figs

The conspicuous feature of this paper is the valuable series of observations upon the Hymenopterous parasites of common flies, observations which are as much instructive and suggestive to the biologist as they are to the sanitary economist, their informative value to the latter being greatly enhanced by a full and excellent set of figures.

The Hymenopterous parasites of flies here brought under observance include 3 species of *Cynipidae*, 4 of *Proctotrupidae*, 7 of *Chalcididae*, 2 of *Ichneumonidae*, and 4 of *Braconidae*. The most prevalent and important of them are three species of Chalcidids, namely *Mellitobia acasta*, *Nasonia brevicornis*, and *Dibrachys cavus*, and a Braconid, *Alysia manducator*—the first and the last of these four species seeming to be most persistently formidable.

A very full account is given of *Mellitobia acasta*, a species which makes its initial attack on flies in their pupal, never in their larval stage.

In the account of *Alysia manducator* it is stated that this species initiates its attack on flies in their well-grown maggot stage, and that ultimately only one adult parasite issues from the infected puparium. Maggots feeding on faecal material were never seen to be touched.

Dibrachys cavus and *Nasonia brevicornis*, like *Mellitobia acasta*, attack the puparia of flies, and many parasites emerge from a single puparium. Both the males and the females of the *Nasonia* vary greatly in size, some of the males being very small and some of the females very large. The males, as in *M. acasta*, have very small wings and cannot fly.

Besides these many Hymenoptera the author mentions a Gamasid parasite which occurs in great numbers and was observed to attack and destroy the eggs and new-hatched larvae of flies. Several species

of beetles also interfered seriously with experiments conducted under natural conditions by destroying or carrying off larvae and pupae of flies the beetles specified are *Cieophilus maxillosus*, *Necrophorus humator* (Burying beetle), *Hister cadaverinus*, and *Pterostichus madidus*

A A

LEFROY (H Maxwell) **Fly-Sprays**—*Trans Soc Trop Med & Hyg*
1919 May 16 Vol 13 No 1 pp 1-9

The author advocates spraying not as a method of front rank importance for eradicating flies, but merely as a means of rapidly killing off a plague of flies in a hospital or a house, particularly in the tropics The liquid recommended for spraying is a 1 in 30 watery solution of the following mixture —Alcoholic extract of Pyrethrum 1 gal, Safrol 1 gal, Soap about 1 oz (The extract of pyrethrum is made by macerating 2 lb of pyrethrum powder in 1 gal of spirit)

The mixture, which was adopted as the Army Fly-spray, did not act in Mesopotamia owing to the great heat, but the addition of $\frac{1}{2}$ to 2 per cent of castor oil was afterwards found to make it effective in a temperature up to at least 115° F

The author gives a long list of other substances that he has tested as fly-sprays

In a discussion of the paper most of the speakers were of opinion that the destruction of flies by spraying was a business proposition in certain circumstances, particularly in a confined space such as a hut, or tent, or a ship, or even in an open courtyard Major E E AUSTEN spoke of having on one occasion seen all the flies in a closed hut destroyed by sprinkling pyrethrum powder from a screw of muslin held by a person walking about the hut, and therefore questioned whether it was necessary to elaborate that simple method, and Mr A W J POMEROY spoke of fly-spraying in hospitals causing discomfort to patients

A A

LURZ (Adolphe) **A Contribution to the Knowledge of Brazilian Oestridæ**—*Mem Inst Oswaldo Cruz* 1918 Vol 10 No 2
[Second Section Translations pp 118-137 With 3 plates]
[The Original Paper in Portuguese is at pp 94-116 of Vol 9 No 1 of the Memorias]

This paper contains, *inter alia*, some interesting notes on *Dermatobia hominis* (*noaxalis* vel *cyaniventris*) a species easily recognised by its small size (about that of a blow-fly), absence of hair, brick-red eyes (in life), striped scutum, and metallic blue abdomen Females seem to be more numerous than males and are easily distinguished by their ovipositor The eggs are small and very numerous over 900 have been counted in one specimen, but this is nothing to a species of the near-related genus *Cuterebra* in a specimen of which TOWNSEND counted over 10,000 ripe eggs

Dermatobia is not often seen flying Its hosts are numerous, among them the author considers the ox to be the commonest It has been observed sometimes holding other flies between its legs, probably with the object of using them for oviposition The author

has observed the eggs adhering to species of *Anthomyia* and *Synthesiomia*. Such adherent eggs when ready to hatch were approached to the author's arm and also to the shaven skin of a dog. The larvae transferred themselves and seemed to attack the skin of the dog with more alacrity than that of man. Partly emerged larvae may retreat into the eggshell again and close the lid behind them. A larva took more than an hour to burrow into the author's skin, and then its posterior fourth remained horizontal beneath the cuticle. Its passage caused slight burning pain which ceased when the act was complete. Next day the site of penetration had scabbed. On removal of the scab a fine opening was seen from which serum could be made to exude. The following day the scab had reformed in the centre of a papule. The author removed the scab and placed a cover glass on the orifice through which the slender projecting breathing-tube of the larva could be seen.

The author describes four new species of Brazilian *Cuterebra* and redescribes the characters of other American genera and species of Oestridae. He gives the following key of the genera (adults)

- | | |
|--|------------------------------|
| 1 Under side of head with deep longitudinal fissure containing the proboscis | 4 |
| No such fissure (<i>Oestrinae typicae</i>) | 2 |
| 2 No transverse apical vein, squamae small (<i>Gastrophilae</i>) | 3 |
| 3 Empodia and ocelli distinct | <i>Gastrophilus</i> Leach |
| 4 Arista pinnate | 5 |
| Arista bare | <i>Rogenhoferia</i> Brauer |
| 5 Arista pinnate on upper side only | 6 |
| Arista pinnate on both sides | <i>Pseudogametes</i> Bischof |
| 6 Face with calli. Tarsi broad | <i>Cuterebra</i> Clark |
| Face without calli. Tarsi slender | <i>Dermatobia</i> Macquart |

The genus *Oestrus* also occurs in S. America, having been, like *Gastrophilus*, introduced

A A

ROUBAUD (E) Les particularités de la nutrition et la vie symbiotique chez les mouches tsétsés—*Ann. Inst. Pasteur* 1919 Aug Vol 33 No 8 pp 489-536 With 17 figs

In this brilliant memoir, which if speculative in outlook is yet compacted of suggestive fact, the author investigates certain phenomena of nutrition in the tsetse flies, and his investigation leads him to the conclusions that (1) a restrictive diet of hot blood (for though tsetse flies will on occasion suck cold-blooded vertebrates, they cannot, the author says, breed on that diet), (2) the presence of symbiotic Schizomycetes in the midgut and (3) pupariation, as occurring in the Dipterous Order, are not mere coincidences, but are an established natural trilogy.

With *Glossina* in all three stages of its existence, larva, pupa and adult imago, digestion appears from the author's researches to be a remarkably tough proposition.

The larva, parasitically gorging the maternal milk, can only assimilate the fats. The albuminoid constituents merely accumulate in the stomach, which—since communication with the rectum is occluded—they distend immoderately.

After birth therefore, the pupa has to deal with this great bag of hoarded albuminoids, in addition to carrying out internal developmental changes of a critical kind. It is this difficulty, the author states, that explains the greatly prolonged pupal stage, and also the

peculiar vulnerability of the pupa shown particularly in its fatal sensitiveness to the sun. The author describes the manner of regeneration of the gut in the pupal stage, which, however, is only peculiar in the fact that a considerable residuum of the larval hoard of albuminoid material appears to be handed on to the adult.

Coming next to the *imago*, the author points out that tsetse flies, like the *Pupipara* but unlike the other blood sucking *Diptera*—unlike even their nearest relatives *Stomoxys*, *Lyperosia*, etc.—satisfy their thirst, as well as their hunger with blood. Mosquitoes, *Tabanids*, *Stomoxys*—all these are known to drink water, but *Glossina* does not and dies if it cannot suck blood either from a vertebrate, or (experimentally) through an animal membrane. The author shows how this necessary fact of existence is reflected in the endodermal gut. In the anterior part of the gut only the fluids of the ingested blood are absorbed, the heavy work of dealing with the solids falling on the posterior third. Here, in this posterior third of the gut, there exist clumps or discontinuous zones of a peculiar epithelium, whose individual cells are not only of singularly pre eminent size and endowed with certain peculiarities of nucleus, but also are highly charged with *Schizomycetes* of a nature intermediate between the yeasts and the fission-yeasts.

Similar fungi are of constant occurrence in certain tissues of numerous insects, and these particular fungi of *Glossina* were discovered by STUHLMANN, who regarded them as adjuvants to cellular regeneration and styled them "Symbiotes."

[Why—except that, as the great PORSON said long ago, "the Germans in Greek are sadly to seek"—STUHLMANN should have coined this strange word, when there exists a perfectly good Greek word "Symbiotes" meaning "companion" or "partner" is a question to be asked.]

The author states that these "Symbiotes" are constant to *Glossina*. He has looked, but cannot find them to be so, in *Culicidae*, *Tabanidae*, *Stomoxys*, *Lyperosia*, and the larva of *Auchmeromyia*. But—and this is the suggestive fact—they are known to be present in *Melophagus*, and he has found them also in *Lipoptena* and *Hippobosca*, that is to say, intestinal "Symbiotes" are characteristic of three genera of flies which, like *Glossina*, drink nothing but blood, and nurse their young in the womb and deliver them as (or wellnigh) pupae.

The author regards the "Symbiotes" of *Glossina*—since they are discharged from the cells into the lumen of the gut—as being connected with active digestion. Though he does not expressly say so, he leaves it to be inferred that the tsetse-fly, gorged with an inordinate quantity of blood by reason of its peculiar propensities, requires assistance in assimilating it, and that the "Symbiotes" are ancillaries to this end.

The symbiotic fungi and the peculiar cells where they lodge are described and figured, and their history is traced as far as possible. The author has not yet found them in the *egg* (or in the ovary, or in the maternal milk glands), but he observes them constantly in the epithelial cells of a particular corner of the proventriculus of the *larva*. In the *pupa* these particular cells participate in the delamination that accompanies the normal reconstruction of the gut, and the "Symbiotes" (with the disintegrated remains of their lodging) can be observed in the lumen of the reconstructed gut and eventually in its wall in the region where they occur in the adult.

To end a tale of length, in the author's view these intestinal associates, or "Symbiotes" lodged in special cells and discharged into the lumen of the most active part of the adult gut, and also active in the larval and pupal stages, are an essential determining factor in the fixation of the pupiparous type of Diptera

The paper is a fascinating one and should be read in full not only for the fine quality of its generalisations but also for its wealth of suggestive fact. Nor is it lacking in practical applications, one of which, as the author duly emphasises, is that the peculiar sensitiveness of the pupa to the sun's rays completely justifies clearing as the leading sanitary policy against tsetse-flies

A A

EVANS (Alwen M) **On the Genital Armature of the Female Tsetse-flies (*Glossina*)**—*Ann Trop Med & Parasitol* 1919 May Vol 13 No 1 pp 31-56

This paper is a record of investigations, the object of which was to discover characters of systematic value in the armature of female tsetse flies. In so far as the differentiation of individual species is concerned but little success was obtained in the case of the *palpalis* and *morsitans* groups, but in the *fuscus* group the armature of each species was found to exhibit at least one distinctive character. The armature of the females falls into three clearly defined structural types, which correspond to the three groups into which NEWSTEAD divided the genus *Glossina* on the characters of the male armature.

A general account of the morphology of the female armature is given, and the essential characters are shown in the figures

W Yorke

DUKE (H Lyndhurst) **An Enquiry into the Relations of *Glossina morsitans* and Ungulate Game, with Special Reference to Rinderpest**—*Bull Entom Res* 1919 Nov Vol 10 No 1 pp 7-20 With 2 Charts

In this interesting paper the author describes and discusses his own observations of a fly-belt in the Northern Province of the Uganda Protectorate both before and after a recent visitation of rinderpest, and endeavours to bring them into line with other records of epidemic rinderpest in a tsetse-fly area with the object of explaining exactly how the distribution of the fly is affected by such epidemics.

There is, says the author, a general consensus of opinion that the great S African rinderpest epidemic of the nineties resulted in a marked diminution of *Glossina morsitans* in the areas affected—in some places to the verge of disappearance, and this effect has generally been attributed directly to the destruction of the wild animals upon which the fly depends for blood. The author, however, after a careful review of the evidence, is not satisfied that the destruction of game could anywhere have been so complete as to lead to the actual starving out of the fly.

Then it has been supposed—though casual experiment did not support the assumption—that the blood in rinderpest infection might be noxious to the fly. The author, however, in a series of careful experiments with *Glossina palpalis* (a sufficiency of *G. morsitans* not having been at the time obtainable) verified the fact that rinderpest blood has no effect on the fly, nor did he find—though he would not

pronounce decisively on this point—any peculiar effect on the fly's reproduction

In the Uganda fly-belt, which he had surveyed some years before it was affected recently by rinderpest, the author found, when he visited it after the epidemic, that the numbers of *G. morsitans*—though not of *G. palpalis*—were remarkably diminished. Considerable numbers of waterbuck and buffalo had survived the epidemic so that the decrease of *morsitans* could not be due simply to starvation.

Reduction of food supply must have had something to do with it, for the rinderpest had raged all through the season of long grass, at which season the bushbuck and warthog, upon which mainly the fly feeds, are difficult to find even when their numbers are not thinned by disease. But subsequently an unusually early and persistent drought led to an abnormally early dying of the grass, and this to an unusually extensive and complete burning of the bush. This in turn deprived the fly of its necessary shelter and destroyed its breeding grounds.

The author therefore concludes that in his Uganda fly-belt the decrease of *Glossina morsitans* after the passage of this epidemic of rinderpest is partly attributable to the epidemic having occurred at a particular season, and partly—and independently—to concomitant, or, at least, nearly coincident, meteorological abnormalities. In his search for corroborative testimony from the records of the South African epidemic he cannot, however, find any mention of the meteorological conditions, though he does find that the epidemic raged during the season of long grass, when game, even when it is plentiful, is difficult to discover.

The author's incidental inference is that *G. morsitans* should be attacked during the dry season, when Nature herself is bearing hard upon the insect, and his recommendations for attack include drainage and filling of waterholes and destruction of game in the foci of the fly, and extensive, sustained and systematised burning of bush.

A A

JACK (Rupert W.) *Tsetse Fly in Southern Rhodesia 1918*—*Bull Entom Res* 1919 Nov Vol 10 No 1 pp 71-90 With 3 plates and 3 maps

The author reviews in most interesting detail the recent history and present condition of the six principal fly-zones of Southern Rhodesia, of which five are *morsitans* areas, and one—on the Portuguese frontier—is common territory of *brevipalpis* and *pallidipes*.

In four of them the fly has been extending its range, and the author is convinced that the chief influence in this extension is the abundance of large game, and possibly in one case the existence also of many and large troops of baboons. On the other hand in two zones the fly is not extending—in one of them indeed it has been steadily losing ground and in places seems to have died out, and both these zones support the author's argument, by the "method of difference," for in both of them there has been much shooting of large game.

Of the zone where the fly is on the decline the author gives a full and most instructive account. He shows that although after the rinderpest year (1896-97) it had shrunk, yet by 1902 fly were again spreading, and by 1908 had become abundant and very active.

Between 1908 and 1913 the area was freely shot, both by professional hunters and by others, and in the latter year its virgin forest began to be utilized for fuel and other industrial purposes. Since then the numbers of the fly have been gradually reduced—to actual extinction in some places.

The author has much to say about the breeding of *Glossina morsitans*, though search was made for pupae in only one area. Here, in the dry season, pupae could be found in almost any sheltered spot at the foot of the evergreen trees, and in the hollow of *one* such tree 45 live pupae and several hundreds of empty pupa-cases were discovered. The author is not disposed to regard this discovery as a confirmation of Lloyd's opinion that this species breeds *only* in the dry season. It may be so, but, on the other hand, it may merely be an obvious outcome of the fact that in the dry season the fly congregates in particular shady places where its reproductive activity is plainly manifest, and the author would suspend judgement until more is known of what happens in the wet season when the fly is widely scattered and its doings are less easy to trace. The author, however, confirms LLOYD and LAMBORN as to the abatement of breeding and the protraction of the pupal stage during the colder season.

In a special section the author returns to the question of the dependence of *Glossina morsitans* upon big game. He discusses the evidence on both sides very fairly, and he reiterates his opinion that in Southern Rhodesia the distribution of the fly is vitally connected with the distribution of the larger mammals. He admits that this may not always be the case elsewhere, but, in such limited records of local humidity and temperature as are forthcoming, he can find no evidence of any unusual meteorological conditions that can be supposed to have influenced the distribution of the fly. [The Statistics are only monthly mean rainfalls for 4 years (1895-99) at Salisbury and Hopefontain, for 2 years at Baroma, and 1 year at Zumbo, and mean thermometer readings for the same time (1894-97) at the last two places.]

As to the manner in which fly-belts spread, observations in Southern Rhodesia tend to show that it is a gradual—though often very far from regular—extension along favourable channels—the favourable channels being those that provide shade and big game. An inadequately shaded tract of moderate breadth, though it may greatly retard, need not be a permanent check to the advance, since it may be crossed in the wet season, but tracts affording only summer shade can be surmounted only if the fly has become established in large numbers at the previous dry-season limit. The operation of these natural checks suggests to the author, as a protection measure, the clearing of a comparatively narrow strip of forest.

A A

BANKS (Charles S.) *Phlebotomus Nicnic*, a New Species, the First Philippine Record for this Genus—*Philippine Jl Sci* 1919 Feb Vol 14 No 2 pp 161-165 With 1 plate

The following are the most remarkable features of this species, which is believed to breed in the local kitchen drains —

The distal part of the upper surface of the clypeus is studded with conical granules. The proboscis is half the length of the entire head.

the two distal segments of the palps are filiform the first segment of the antennal *flagellum* is one-sixth the length of the entire flagellum. The pronotum is much reduced. The wings are twice the length of the abdomen, their greatest breadth is one-third their length in both sexes, and the petiole of the first fork of the second longitudinal vein equals the anterior branch of the fork in length. The hairs of the abdomen are semi-erect. The upper claspers of the male are obliquely spathulate and are said to carry four distal spines (though the figure appears to show six).

The specific name *minic* is Tagalog for "tiny fly too small to be seen". The fly was particularly abundant in the vicinity of the College of Agriculture, Los Banos, in July 1915, but has not so far been found anywhere else. The mouth-parts are identical in both sexes.

A A

MITTER (J. L.) Preliminary Report on an Investigation into the Breeding Places of *Phlebotomus* (*Papatasi* and *Minutus*) in Lahore — *Indian Jl Med Res* 1919 Apl Vol 6 No 4 pp 452-461

This is a record of patience at length rewarded after many trials. After an unsuccessful search through material collected from 15 likely spots, the author at last hit upon a piece of palm-leaf-matting rotting in a damp corner of a cellar full of old furniture and domestic rejecta, which had not been opened for about a year. Earth collected from under this matting contained numerous larvae and some pupae which in time gave issue to adults of *P. papatasi*. A second discovery of larvae of this species was made in damp earth from the floor of an old unused fowl-house full of bricks.

P. minutus was found in a heap of garden refuse that had lain untouched under a tree about a year, in earth under flower-pots that had not been moved for three months, and again in an old undisturbed rubbish-heap in a shady corner of the public gardens.

How difficult the larvae—and a fortiori the eggs—are to find is exemplified by the author's statement that from a pound of earth which to careful microscopic search yielded only 11 larvae, 26 adults emerged.

The author gives a good resumé of prior investigations and a useful list of references.

A A

WEISS (A.) Sur un nouveau Pulcide, *Ceratophyllus Haesulatonis Desideratus*, nouvelle sous-espece — *Arch Inst Pasteur de Tunis* 1919 June Vol 11 No 1 pp 24-27 With 2 figs

The flea here described, apparently from a single male individual, came from Southern Tunis, and is stated to be a parasite of *Psammomys algirus* and *Mus alexandrinus*. The author considers it to be a hybrid between *Ceratophyllus maurus* and *C. barbarus* Rothschild, but describes it apparently as a new subspecies of a new species under the name *Ceratophyllus haesulatonis desideratus*, the specific name seeming to imply a certain amount of indecision in the matter.

A A

BERTRAND (G), BROcq-ROUSSEAU & DASSONVILLE **Destruction de la Punaise des lits (*Cimex lectularius* Mer) par la chloropicrine**—*C R Acad Sci* 1919 Sept 1 Vol 159 No 9 pp 441-443

The authors give graduated time tables of the effects of the penetrating vapour of chloropicrine on bed bugs, and they describe a practical application of their experiments where in a chamber measuring 75 cubic meters eight infested beds were exposed to the vapour emanating from 750 grammes (*i e*, 10 grammes to the cubic metre) of this substance. At the end of 4 hours every bug was dead.

A A

RODHAIN (J) **Remarques au sujet de la Biologie de l'*Ornithodoros moubata***—*C R Soc Biol* 1919 July 19 Vol 82 No 23 pp 934-936, & pp 937-940

This paper refers to some points in the habitat, habits, and geographical range of *Ornithodoros moubata*. On the eastern coast of L. Tanganyika the author discovered this tick—which typically haunts human dwellings—infesting the bark of the trees in a grove of mangoes. In the same area he once found two individuals begorged with bird's blood, and he thereupon satisfied himself that this species will feed on the domestic fowl. He notes that other observers have reported it as feeding on the wart-hog and the domestic pig, and he comments on the pathogenic significance of this evidence of the tick's impartiality.

Discussing the distribution in tropical Africa of this dangerous species, which, through existing in the drier eastern parts of Belgian Congo, and also—so he states—in French Congo and in Angola, has not penetrated into the western part of Belgian Congo, he believes that its westerly progress has been impeached, if not directly stopped by the humid climate of equatorial Congo.

A A

BEQUAERT (J) **L'*Ornithodoros moubata* dans le Nord-Est du Congo Belge**—*Bull Soc Path Exot* 1919 Oct 8 Vol 12 No 8 pp 517-520

The author states that *O. moubata* established itself many years ago in the district of Haut-Ituri, though at present it does not seem to be known along the Aruwimi and Ituri rivers and their affluents.

He thinks that the plateau of Walendu is one of the primitive autochthonous centres of this tick where it must have existed long before the arrival of Arabs and Europeans.

A A

CHALMERS (Albert J) **Oedema of the Eyelids caused by Ants**—*Jl Trop Med & Hyg* 1919 June 16 Vol 22 No 12 p 117 With 1 plate

The author by a particularly satisfactory observation confirms his suggestion, published about nine months ago, that oedema of the eyelids occurring in Europeans and natives in Khartum may be caused by the ants known to science as *Monomorium bicolor* sub sp *nitidiventrie* and in the vernacular as Darra.

A A.

- 1 BACOT (A) & TALBOT (George) 11 BACOT (A) & LLOYD (L)
Experiments on the Destruction of Lice and Nits 1 The Survival
 Period of Lice and Nits (*Pediculus humanus*) when Submerged
 in Tap Water and Water containing 1 per cent of Salt at Various
 Temperatures 11 Experiments concerning the Destruction of
 Active Lice (*Pediculus humanus*) by Solutions of Cresol Soap
 Emulsion and Lysol, and of Lice and Nits with Kerosene, with a
 View to the Use of these Remedies for the Treatment of Verminous
 Heads —*Brit Med Jl* 1919 Nov 29 pp 703-705

With regard to 1 the authors conclude from their experiments that simple soaking of lice-infested clothing, etc, even for a term of 24 hours cannot be surely relied on to kill all the lice unless the temperature of the water be above 90° F 11 Their experiments lead them to conclude, with regard to 11 that immersion of lice infested clothing, etc, in a 2 per cent solution of lysol at 100° to 104° F for 30 minutes can be relied on to kill all lice Also that immersion in a 1½ per cent cold solution of lysol for one hour is efficacious if the clothing be allowed to dry as removed from the solution, but not if the solution is first rinsed out with water Also that sponging the head with the hot lysol solution specified above cannot be relied on to kill all the lice (though it will kill the nits) in hair if the solution straightway be washed out with water They also confirm the well known fact that immersion of lice and nits in ordinary kerosene oil is fatal to the insects, though they also show that if the kerosene be washed out by transferring the insects to tepid soapy-water some of them may make a partial and temporary recovery

A A

- BANKS (Charles S) **The Bloodsucking Insects of the Philippines** —
Philippine Jl Sci 1919 Feb Vol 14 No 2 pp 169-189

This paper includes a list of the blood-sucking insects—Culicidae not all specified individually—at present known in the Philippines, with some general remarks on the different groups and a bibliography Some of these insects belong to families that would hardly be suspected of the practice of blood-sucking such are the Jassid bug, *Nephotettix*, and a species of *Thrips* [DONOVAN in India has observed a Jassid bug sucking blood]

Among the worst seasonal pests in the provinces the author notes *Mansonia uniformis* and *annulifera* and *Culicoides ruficandus* The last-named species finds its way through mosquito nets, and also causes much trouble at night in fowl-houses

Lyperosia exigua is a common cattle pest throughout the islands It swarms in hundreds on every part of the body of its victims, and the coat of a cow will frequently be found matted with dried blood after its attacks

The author includes 18 species of Robber flies (*Asilidae*) in the list of blood-suckers

A A

- CLEARE (Laurence D) **A Useful Breeding Cage** —*Bull Entom Res*
 1919 Nov Vol 10 No 1 pp 43-44 With 1 text fig

The breeding cage here described is a piece of brass-wire-gauze, 20 meshes to the inch, rolled to form a cylinder, which is held fast with

brass paper-clips The cylinder is closed at either end, for top and bottom, with a large close-fitting petri dish, or a metal cap, or even with a piece of muslin held by a rubber band Such improvised cages can be adapted and modified in many ways, and they have been in constant use in the author's laboratory for the last four years

A A

MOORE (Alfred) **A Simple Method of Mounting and Preserving Insects,**
etc—*Jl Trop Med & Hyg* 1919 Nov 15 Vol 22 No 22
pp 205-206 With 1 plate

The specimen to be mounted is placed on a glass-slide inside a good solid ring of some plastic material—the author recommends “plasticine” impregnated with thymol Another glass slide is superposed accurately on the first so as to rest firmly on the plastic ring and also just to bear upon and steady the specimen The two slides are then permanently fastened together with gummed paper

[If the specimen is thoroughly dry to begin with, and if the thymol (or any other insecticide that may be incorporated with the plastic material) is sufficient, this method is a very good one]

A A

COFFIN (S W) **A Case of Viper Poisoning—***Indian Med Gaz*
1919 June Vol 54 No 6 pp 207-209

The accident occurred in Southern India, at 8 p m, that is to say some time after sundown No snake was produced as a *corpus delicti* and there is no positive statement that any snake was actually seen alive

A snake certainly appeared ten days after the event, when a Russell's viper was caught in a drain close to the spot

The wound was on the foot, and as it was not accompanied by any symptoms except pain, it was at the moment supposed to have been inflicted by a harmless snake The persistence of pain, however, was regarded as suspicious, and the patient was treated by ligature, local incision, permanganate, and Kasauli antivenene, after which he was left in a fairly comfortable condition and with a good pulse The next day the patient seemed fairly well, though somewhat drowsy in the afternoon—hardly an alarming symptom But on the third morning he was found in a state of utter collapse, gasping for air, and vomiting, and from this critical state, though skilfully treated for shock and for suspected snake-poison, he did not recover until evening On the fourth day he was better, but the local incision was swollen and painful On the fifth and sixth days there was considerable epistaxis Fourteen days after the accident the patient was up, and a small slough was separating from the surgical incision During the course of the illness constipation and tenderness of the epigastrium were manifest, but there were no paralyses

Colonel WALL, who communicates the paper, appears to be satisfied that the hostile agent was a viper—by exclusion either *Vipera russelli* or *Echis carinatus*, but the inference is much open to question, and the possibility of something other than a snake—e g, a scorpion—does not seem to have been considered

A A

TAYLOR (W R) **A Case of Daboia Poisoning**—*Indian Med Gaz*
1919 Sept Vol 52 No 9 pp 337-338

The victim, who must have been bitten in the foot, had tied a cord round his leg below the knee, and had walked home before he was brought to hospital, where he was seen about 2 hours after the accident.

On admission the pain was great, the leg was much swollen up to the ligature, and the immediate region of the puncture was discoloured. The patient was in a cold sweat, and respiration was shallow. Vomiting of blood and mucus, which was said also to have happened before admission, occurred again.

20 cc of Kasauli antivenene was injected by vein, and the same quantity under the skin of the abdomen. A crucial incision was made through the puncture, and solid permanganate of potash applied. The rough ligature was removed, and a tourniquet applied above the knee. 1 cc of pituitrin was also given. Sometime afterwards, another 20 cc of Kasauli antivenene was injected subcutaneously.

Fourteen hours after the bite pain was still severe, there was considerable oozing from the incisions, the foot was discoloured, and the swelling had spread above the knee. Twenty-four hours after the bite there was still great pain. Thirty-six hours after the bite the pain had diminished, but the leg and thigh were enormously swollen, and there were patches of subcutaneous haemorrhage especially where the ligature and tourniquet had been applied.

Afterwards the oedema extended to the abdomen and loin, and the hip and buttock showed discoloration, and when the patient was discharged in the 13th day the leg was still much swollen.

During the first two days of treatment 180 grains of calcium lactate were given in 30 grain doses.

The Kasauli venom was at least two years old.

On the second day of treatment the patient twice tried a cigarette but on each occasion he became faint after the first whiff.

The snake was actually identified as a Russell's viper.

A A

WALL (F) **Snake Venom as a Therapeutic Agent**.—*Indian Med Gaz* 1919 Sept Vol 54 No 9 pp 330-331

[Most people who are interested in snakes and their venoms must have speculated among other things on the possible therapeutic use of the venoms. One cannot help thinking that things that go straight to a definite spot like a torpedo must in competent hands have some application in the critical stages of certain diseases, and so justify the words of the omniscient poet, that

“Nought so vile that on the earth doth live
But to the earth some special good doth give”]

The author's suggestion is that doses of snake venom calculated to be lethal merely to those microorganisms might be injected by vein to destroy spirochaetes, haemoflagellates, haemosporida, etc., and he proposes that an experiment might be tried with cobra-venom for surra.

A A.

- FUKUSHIMA (A) [Resistance of Red Corpuscles to the Hemolysin of *Trimeresurus* and *Ancistrodon* after Excision of the Spleen and after Ligation of the Splenic Vein]—*Chū Gar Iyū Shimpō* (Home and Foreign Med News) 1918 Jan 20 No 908 pp 63-74
[From Review by R G Mills]

The author, experimenting on the resistance (*in vitro*) of the red blood cells of the dog to the haemolytic action of the venom of the pit-vipers *Lachesis* (= *Trimeresurus*) and *Ancistrodon* after splenectomy and after ligation of the splenic vein obtained the following results

On the third day after splenectomy the resistance was increased, and so continued for 4 to 8 weeks, when it became normal again, or slightly subnormal,

Immediately after ligation of the splenic vein resistance was diminished but rose gradually until at the end of 4 weeks it was above normal

A A

- WATSON (Allan) Case of Death from Scorpion Stings—*Lancet* 1919 May 24 p 889

The victim, a British soldier aged 21 of inferior physique serving in Mesopotamia, was stung three times by a green scorpion 3 inches long, at 11 o'clock at night The scorpion was produced The man, who appeared somewhat nervous, complained of a general "pins and needles" sensation after receiving some brandy he fell asleep At 5 o'clock next morning his condition seemed good and his pulse and temperature were normal, though he still complained of the "pins and needles," but at 6 o'clock he suddenly collapsed, though retaining consciousness Under stimulant treatment, which included strychnine and digitalin hypodermically, he again recovered, and by midday he seemed out of danger But at 4 15 p m though still receiving treatment, he suddenly collapsed again and died

The report is a model of precision and point

A A

- HOUSSAY (B A) & NEGRETTE (J) Nuevos estudios experimentales sobre la acción fisiológica de las ponzoñas de las arañas — [Conclusions in English]—*Rev Inst Bacteriolog* 1919 June Vol 2 No 2 pp 189-200 With 10 figs

The following are the author's conclusions regarding the venom of certain spiders—The venom of the Theraphose spiders diminishes arterial pressure and kills mammals and batrachians by paralysis similar to that caused by curare The bite of *Lathrodectus mactans* is not fatal to, but causes very severe effects in dogs, rats and rabbits but guinea-pigs are very sensitive and die asphyxiated, the lungs being dilated and emphysematous

A A

- COFFIN (Stephen W) Notes on a Case of Centipede Bite.—*Lancet* 1919 June 28 pp 1117-1118

In this case, which occurred in Southern India, the patient was bitten on the scrotum, at night, and stated that he actually knocked

the animal off his person. The bite was followed immediately by considerable pain, later by vomiting, and later still by the formation of large bullae on the scrotum, and thereafter by the outbreak of a papular and vesicular eruption, picking out the hair-follicles, on chest, neck and arms. The following day the bullae burst, leaving the whole scrotum raw, and the rash spread to face, shoulders, abdomen, and legs. The rash began to desquamate late on the 5th day. On a first view the patient's condition might have suggested smallpox or chicken pox. The temperature did not rise above 99°F.

A A

FULLEBORN (F) Ueber die Entwicklung von *Porocephalus* und dessen pathogene Bedeutung—*Beihefte z. Archiv f. Schiffs- u. Trop.-Hyg.* 1919 May Vol 23 No 1 pp 1-35 With 12 figs & 5 plates

This paper is abundantly illustrated with good figures.

The author fed two *Macacus* monkeys with eggs of *Porocephalus* from a *Boa constrictor* and a *Python reticulatus*, of which only the latter seem to have germinated.

One monkey died 237 days after infection with the eggs from the python, and about 1,000 ripe cysts of *Porocephalus moniliformis* were found in different parts of the thoracic-abdominal cavity. Most of the cysts occurred in clusters in the omentum and pelvic peritoneum, but the liver and its capsule, the walls of the stomach and small and large intestine, the lung, and the pericardium were also affected.

Some common grass-snakes (*Tropidonotus natrix*) were forced to ingest some of these cysts. About 24 hours afterwards the larvae had escaped from their capsules and were burrowing through the stomach of one of the snakes, and in the course of 4 to 23 days the young *Porocephalus* were in other individuals traced into the connective tissue in the neighbourhood of the lung, and by the 32nd day into the lung itself.

The other monkey died 61 days after infection, and some very small cysts with larvae in an early stage of development were found in the omentum and mesenteric glands. These, the author thinks, were also *P. moniliformis*.

The author states that *Porocephalus amillatus* infection is common in man in the Cameroons, but he regards it as probably a harmless parasite. A massive infection, such as that observed in the monkey aforesaid with *P. moniliformis*, might however have very serious consequences.

A A

FOULERTON (Alexander G. R.) The Rat as a Carrier of Diseases Transmissible to Man and to Other Lower Animals—*Jl. Comp. Path. & Therap.* 1919, Sept Vol 32 Part 3 pp 182-196

This is a studied indictment of the rat as a ubiquitous and ever imminent danger to the public health. It is shown how in return for the protection and unfailing sustenance received from association with man the rat keeps the plague bacillus going, helps to spread trichiniasis and Weil's disease, and communicates to man by its bite and perhaps also by its contamination of food the *Spirochaeta morsus-muris*.

Rat-tuberculosis also—a localised infective process due to an acid fast species of streptothrix, and pseudo-tuberculosis of the rat—a highly infectious disease due to a bacillus resembling some of those included in the Colon Gaertner group, are diseases of the rat which may possibly have extraneous relations. On the other hand the author notes that rats are extremely resistant to the bacillus of human tuberculosis.

As regards Weil's disease the author points out that although not often recorded in this country, mild cases may have passed unrecognised as catarrhal jaundice. He also states his conviction that this infection was spread in the trenches of Flanders by means of rat-contaminated food.

As regards trichiniasis the author emphasises the point that an infected rat may discharge active embryos of the worm in its faeces so that pigs are likely enough to get infected from food and feeding-troughs fouled by rats.

A - A

LUTZ (Adolphe), DE SOUZA ARAUJO (H C) & DA FONSECA Filho (Olympio) *Viagens científicas no Rio Parana e a Assuncion com volta por Buenos Aires Montevideo e Rio Grande—Mem. Inst. Oswaldo Cruz* 1918 Vol 10 No 2 pp 104-173 With 82 photographs [English Translation at pp 83-102 of Second Section]

This is a summary of the author's observations and collections in the course of an extensive voyage on the Parana and its affluents. The Entomology notes are by Dr A LUTZ, those on Protozoology by Dr O Ribeiro da FONSECA, and those on Medical and Sanitary matters by Dr H DE SOUZA ARAUJO.

Few insects were seen in the larger rivers in the daytime, among them however are several *Tabanidae*, in particular *Lepidoselaga lepidota*, *Chaetotabanus aurora* (at dusk), and two species of *Diachlorus*. *Anopheles* (*Cellia*) *argyrotarsis* and *albanus* were the only Anophelines seen. The Culicines observed were *Stegomyia fasciata* (in the ports), *Culex fatigans* (ubiquitous), *Culex scapularis* vel *confusus* (in intolerable numbers in the thickets along shore), *C. albifasciatus* (active in daylight, even in sunshine), *Janthinosoma arribalzagae* (in some places on the river banks surpassingly numerous), *Mansonia titillans* (often coming on board at dusk) and another species perhaps *M. pseudotitillans*, *Taeniorhynchus* (rare), *Psorophora ciliata*, and a few others. Culicoides, known as "Mosquitos polvora" or "Polvireños" were found in several places, in houses and verandahs. Several species of *Simulium* are mentioned, including the objectionable *S. pertinax*; these Simuliidae haunt the rivers, and may travel thirty miles from their breeding-places among the falls. Only one specimen of *Phlebotomus* was seen (*P. longipalpis*). A long list of *Tabanidae* is given.

Among parasitic protozoa the author obtained *Balantidium coli* from a patient having no symptoms of dysentery and not complaining of any intestinal trouble, and some *Ciliata* from the stomach of the big stag *Carideus paludosus*. Some specimens of *Triatoma infestans* were found copiously infected with *Trypanosoma cruzi*. A *Leptomonas*

(*L. elmassien*) was discovered in the latex of an Asclepiad (*Araucaria angustifolia*) *Leishmania brasiliensis* is common. The author examined stools in several cases of dysentery and twice found *Chilomastix mesnili* and once *Enteromonas hominis*. The parasite of quartan malaria was the only one not encountered. Of all the many fish examined only one was found infected with *Microsporidia*—this was *Pseudopimelodus charus* (the “pacu”) parasitised by *Henneguya lutzi*.

In the discursive notes dealing with medical and sanitary matters the coast of Paraná is described as “overrun by malaria and ankylostomiasis,” and the whole State of São Paulo in the region of the River Parana is said to be malarious and much infected with *Ancylostoma*, Chagas’ disease, and leishmaniasis. Tropical ulcer of spirillar origin is frequent at certain seasons. In that part of the journey ending in the Argentine malaria is spoken of as hardly known.

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BOOK REVIEWS

CASTELLANI (Aldo) [C M G, M D, M R C P, Lecturer at the London School of Tropical Medicine, etc] and CHALMERS (Albert J) [M D, F R C S, D P H, Director, Wellcome Tropical Research Laboratories (Soudan Government), etc] **Manual of Tropical Medicine 3rd Edition** x + 2436 pp With 16 coloured plates & 909 text figs Demy 8vo 1919 London Bailhere, Tindall & Cox [Price 45s net]

Reading, day by day, little by little, the task—pleasant and profitable—has been completed. Some chapters have been read with greater care than others, but every page has been surveyed. Why this difference? Because by request and by consent this is a review en gros not en detail. The latter would, indeed, be more than a single reviewer could, or should, attempt. The word “pleasant” as used above refers to the rich harvest of information which the text supplies, not to the physical properties of the book. This “Manual” is more than a book, it is an encyclopedia and we readily agree with the authors that it is “unwieldy,” especially for common use in tropic lands where the slightest effort means perspiration. The book weighs five pounds fourteen ounces and cannot be read with comfort except at the desk. Ease and comfort make attention and concentration possible. For the weight, size and shape of the “Manual” the blame does not, perhaps, altogether rest upon the authors. They are in the hands of the publishers who, again, are more or less bound by custom and financial considerations. Nevertheless we await the courageous firm that will issue such like works with each section, or related group of chapters, separately bound in pliable cloth or leather with these separate volumes fitted into a case which might have the form and title of this “Manual of Tropical Medicine.” Then could each section be taken out as required.

Moreover, in order to squeeze the contents into even 2,436 pages much very small type is employed. This, also, adds to the reader's discomfort especially in artificial light for those who do not possess perfect sight. The price is high, but those who need a comprehensive text book or work of reference, will get good value for their money.

Not having read either of the previous editions the reviewer makes no effort of his own to tell how this issue differs from its forerunners. Those who desire such information will find it in the “Preface” to this 3rd Edition. Workers on the Staff of the *Tropical Diseases Bulletin* may therein also, read with pleasure and honest pride —“We have much pleasure in acknowledging our indebtedness to the ‘*Tropical Diseases Bulletin*,’ which has been invaluable to us.”

It is, of course, impossible, in this review, to give complete details of the contents of this “Manual,” but the main sections in each of the three Parts are as follows —

Part I History of Tropical Medicine—Tropical Races—Tropical Climatology—Tropical Foods—Tropical Diseases—Fitness for Tropical Life

Part II The Causation of Disease in the Tropics—Physical Causes—Chemical Causes—Parasites

Part III The Diseases of the Tropics (Clinical, &c)—Fever—General Diseases—Systemic Diseases

Even a glance at the above chief “headings” shows that there must be—as indeed there is—much repetition.

We cannot help thinking that the “Manual” wants pruning and, in part, rearranging. We find, for example, Schistosomiasis due to *S japonicum* in Chap LXV, with a special “heading” —“Katayama Disease,” “Intestinal Schistosomiasis” caused by *S mansoni* in Chap LXXIX and Urinary Schistosomiasis due to *S haematobium* in Chap LXXXV. Chapter LXV is followed by chapters dealing with “Filariases” (LXVI), “Myiasis” (LXVII), “Porrocephalosis” (LXVIII), “Leprosy” (LXIX) and “Histoplasmosis” (LXX).

General nomenclature of parasites we are told follows "as in previous editions the rules of the International Committee" Correct and uniform nomenclature is essential, since nothing is more confusing to students than a variety of names for one organism, but as we shall presently point out custom and convenience may render undesirable the strict following of rules

Many members of the medical profession, careless in matters of nomenclature, deserve the gentle rebuke administered by MERRILL & WADE in the *Philippine Journal of Science* for 1919 (Discomycetes) — "Disregard of rules of nomenclature, by which modern biologists are bound, appears in names and descriptions that have, in sincerity, but without the formality customary with themselves, been published by medical writers"

We doubt whether at the present day anyone will accept and adopt the "*Genus Loeschia*" in place of *Amoeba* and *Entamoeba*, or "*Clinocoris*" in place of *mex* (*Acanthia*)

For the intestinal amoeboid parasites the best and most useful classification seems to be that drawn up by Prof Clifford DOBELL in "*The Amoebae living in Man*"

The human trypanosomes come under "*Trypanosoma*," but we find an old acquaintance—*Tr equiperdum*—disguised as "*Castellanella equiperdum*"

Samuel BUTLER, who has been much in evidence of late owing to the biography written by his friend, Mr Festing JONES, tells all who write books and send them out for review, more than one "home truth" While avoiding the spirit of the critic who wrote "S'il y a quelque chose de desagreceable a dire, comptez sur moi," reviewer and author cannot always see eye to eye It is, nevertheless, true that "the supposition that the world is ever in league to put a man down is childish Hardly less childish is it for an author to lay the blame on reviewers" (Samuel Butler—"The Note Books," p 180)

Both students and practitioners owe a debt of gratitude to Professors Castellani and Chalmers for the pains they have taken to make this 3rd Edition a complete guide to medicine in the tropics

The book contains 16 coloured plates and no less than 909 figures in the text Very useful lists of references will be found at the end of each chapter and the "Manual" possesses a most satisfactory index

The section dealing with Infusoria reminded us that in 1916 a well known naturalist and teacher recognised *Balantidium coli* in the gut of our common cockroach When we asked for permission to mention this discovery it was readily given, but with a caution The observer told us that certain youthful critics suggested that he had failed to distinguish between *Balantidium* and *Nyctotherus* We think not The professor knows his *Nyctotherus* as well as he does his *Balantidium* A warning based upon a single observation is not necessarily valid, but should the discovery be confirmed the cockroach will become an added source of infection *

J H T Walsh

LASSALLE (C F) [M.D., C.M. Edin., D.P.H. Oxon] **Elementary Hygiene, Specially for Schools** vii—113 pp With 37 text figs & 2 plates 1919 Trinidad Printed at the Government Printing Office, Port-of-Spain [Price 2s]

This little book is intended mainly for the use of the teaching staff in Elementary Schools in Trinidad, and Mr H H HANCOCK, Inspector of Schools, contributes a Foreword to Teachers It is due to Dr Lassalle's zeal, Mr HANCOCK writes, that since 1915 instruction on hygiene has been given to teachers In the new Code, Hygiene, instead of being a Special Subject, will take its place along with the 3 R's He points out that success will depend on how the subject is taught, unless unintelligent memorizing is avoided, there will be failure

* It is hoped later to publish a review of the Section of this work entitled "*Parasites*"—[Ed]

The author's effort is to make the teaching in schools "so clear and convincing that home influences will have little effect on their [the children's] convictions" One cannot but wonder whether the few hours spent at school can compensate the all pervading influences of the home. Provided however that legislation is tending to improve the home conditions, and thus reinforcing the school instruction we may expect the best results, and this is probably what is taking place in Trinidad, for Dr Lassalle says that the fruits of the teaching are already becoming manifest in Port of Spain.

The book, which seems well fitted for its purpose, concludes with a Syllabus of Lessons, from which it appears that the whole subject is covered in 60 lessons of half an hour each, and that of these some 15 are concerned with essentially tropical conditions.

A G B

COWLEN (H M) [M A, M D, F R C S (Kingston), F R C P (Kingston), M C P & S (Ontario), M B M Association, Colonial Register Great Britain, Chief Medical Officer, Tonga] **Tuberculosis in Tonga** 15 pp [Also in Tongan language, 15 pp] 1917 Nukualofa, Tonga William Tarr, Government Printer

The Tongan or Friendly Islands are situated some 250 miles to the south east of Fiji. The inhabitants, who number about 23,000, are described as superior in mental development to other South Sea Islanders. This pamphlet, in both English and Tongan, the author of which has spent 5 years in the service of the Tongan Medical Department, has been written owing to the rapid growth and extension of Tuberculosis among the people of the Islands.

The King, George Tubou II, and the Premier contribute prefaces, commending the little book to the people, and the latter states that in 1916 608 cases were known to the medical department. The pamphlet describes the disease in the simplest language, and the precautions which should be adopted. It is proposed to set apart an island for tubercular patients.

A G B

TROPICAL DISEASES BUREAU

TROPICAL DISEASES
BULLETIN

Vol 15]

1920

[No 3

TROPICAL SKIN DISEASES

RISSE Die "Scharabeule"—*Arch f Schiffs- u Trop-Hyg* 1918
 Aug Vol 22 No 15 pp 273-282 With 2 coloured plates-
 2 text-figs & 4 charts

This is a very full and interesting account of an epidemic noted among soldiers along a restricted sector of the front formed by the Schara River. The paper is founded on the observation of 72 cases, the general symptoms in all including an acute onset, with rigors and fever, apparently arising from a small peripheral ulcer, and an extensive enlargement of glands especially about the neck, axilla and groin. The skin over the enlarged glands became reddened, and the glands suppurated in successive stages. The ulcer had undermined edges and was usually scabbed over, or presented a crateriform appearance very like a syphilitic lesion. There was no lymphangitis, and very slight subjective symptoms. 8-12 days later a characteristic skin eruption developed, on the back of the hands, the extensor surface of the fore arms, the face and neck and trunk, consisting of erythema, papules, umbilicated ring-shaped bullae, and favus-like pustules. Rheumatic symptoms were noted in some of the cases. The spleen could not be felt but some enlargement could be detected by percussion. The temperature usually dropped with the appearance of the exanthem, in the course of the first week, and the ulcer would usually heal in 4-5 weeks, leaving a prominent scar. The glands would persist swollen for much longer, the average duration of the disease being given as 61 days. In its earlier stages the affection was somewhat like malaria.

Very careful examinations of the serum and pus from vesicles and pustules gave negative results. Two rabbits inoculated with pus from a suppurating gland remained in good health. There were no blood changes and, in particular, no eosinophilia. A guinea pig inoculated intraperitoneally with diseased blood showed no effect.

The occurrence of the initial ulcer on exposed parts, the richness of the district in insects, the incidence in late summer, suggest to the

author a number of alternative theories of causation. Certain resemblances to a Japanese disease, known as "Kedamkrankheit" [Japanese River Fever], which has been shown by Japanese authors to be caused by an acarus suggest that this affection is due to a similar parasite though this has not been found in the human subjects of the disease, but in field in mice the district an acarus was abundantly present, very similar to the acarus pictured in the Japanese accounts, which however describe a disease which was fatal in 30 per cent of the cases, whereas the author had no deaths in his series. The suggestion is made that the parasite, if that assumption is correct, is a host for a bacterial infection not yet identified.

E. G. Graham Little

CROWI (H. Warren) **A Routine Treatment for Septic Sores and Nile Boils**—*Lancet* 1918 Nov 16 pp 667-669

The author examined 103 cases of septic sore in which category he includes "veldt sore," "baicoo rot," "tropical ulcer" and the army designation "I C T" (inflammation of connective tissue). In open sores the technique is recommended of cleaning up the surface with alcohol and taking cultures from the subsequent flow of serum, by this method the great majority (90.8 per cent) of the author's cases were shown to be streptococci.

The "Nile Boil"—The distinctive features of the lesion are the initial slough with an extensive red areola, extreme tenderness and absence of free pus until the last stage which may require three weeks to develop, deep-seated ulcers may result. The author found the prevalent organism to be a staphylococcus allied to *S. epidermidis albus*, but contrasting with it in virulence.

The author recommends the early incision of the boil so as to divide the central slough, and the administration of a vaccine containing not more than 500,000 cocci, repeated bi-weekly. A similar dose of the appropriate vaccine is recommended in the treatment of the septic sore.

E. G. G. L.

PIJPER (A.) **Eczema and Streptococci**—*S. African Med. Rec.* 1919 June 14 Vol 17 No 11 pp 163-165

The author was able to isolate in two cases of purulent eczema under his care a small streptococcus in pure culture, the reactions of which to cultural tests are carefully described. While showing a general resemblance, the strains from each case were different. An autogenous vaccine in increasing doses, commencing with 3-5 million, produced a rapid and complete cure, without any other treatment.

E. G. G. L.

JOUEAU-DUBREUIL (H.) **Tokelau (*Tinea imbricata*) in Szechwan**—*China Med. J.* 1919 May Vol 33 No 3 pp 223-229

Jouveau-Dubreuil states that, contrary to some text book descriptions, *tinea imbricata* is common in a temperate climate far from the sea, such as Szechwan. The disease is undoubtedly infective, but

individuals may be refractory to infection. Certain parts of the body are comparatively immune, but the face which is usually said to be infrequently involved was in this author's experience commonly affected. Hairy parts may be attacked but the hair is not lost nor are the nails altered. Itching is intense. The application of 10 per cent Chrysophanic acid is the best remedy.

E G G L

WEH (P Emile) & GAUDIN. *Recherches sur les Onychomycoses — C R Soc Biol* 1919 Feb 8 Vol 82 No 3 pp 121-122

The authors out of 13 cases of onychomycosis were able to establish the presence of *Penicillium brevicaulis* of BRUMPT & LANGERON in six instances, a fungus, probably *Scopulariopsis*, in one case, a fungus of the class *Spicaria* in four cases (in one of these in association with *P brevicaulis*), and a *Sterigmatocystis* in two cases.

The clinical characters resemble trichophytosis of the nail, which shows yellow stains and thickening of the free edge, and finally of the whole nail or the nail may become twisted and hornlike (onychogryphosis).

E G G L

ROSS (Andrew O) "Toe Rot" A Rapid Method of Cure — *Jl Roy Naval Med Serv* 1919 Oct Vol 5 No 4 p 432

Internal evidence suggests that this oddly-named condition is eczematoid ringworm of the toes (though the author regards it as "gouty eczema"). It was rapidly cured [as one would expect] by application of "Service antiseptic paste" [not otherwise specified].

E G G L

PUYHAUBERT & JOLLY (R) Note sur un cas de mycétome à grains noirs — *Bull Soc Path Exot* 1919 Feb Vol 12 No 2 pp 57-60 With 3 figs

The patient was a native of the Ivory Coast, with papular lesions of the perineum and upper and inner third of the left buttock and thigh. On pressure of the base of the papule, black grain-like bodies could be extruded. The disease dated from 1914. The fungus was grown on carrot, forming in 15-20 days a thick black felt of mycelial threads.

E G G L

DA SILVA (Pirajá) Duas novas especies de fungos produtores de maduromycose no Brazil [Two New Species of Fungi Productive of Maduromycosis in Brazil] — *Brazil Medico* 1919 Mch 15 Vol 33 No 11 pp 81-83

The author claims to have isolated from the granules in a case of maduromycosis two new fungi to which he has given the name of *Discomyces bahiensis* and *Madurella Ramiroi* respectively. Inoculation experiments on pigeons, rats, bats, etc., were unsuccessful.

F. S. Arnold.

- RIBEYRO (R E) **Sobre un cas de micosis cutanea** [Notes on a Case of Mycosis of the Skin]—*Ann Facul de Med de Lima* 1919 Feb Vol 3 No 7 pp 1-5 With 1 coloured plate

An account of a case presenting a pustular eruption on the arms and legs and front of the thorax. Cultivations from the contents of the pustules revealed a hitherto undescribed fungus which the author classifies with the Hyphomycetes. A coloured plate represents three phases of the parasite.

F S A

- CURRIE (Donald H) & HOLLMAN (Harry T) **The Histological and Bacteriological Investigation of a Juxta-Articular Nodule in a Leper**—*New Orleans Med & Surg J* 1919 Mar Vol 71 No 9 pp 384-388 With 1 fig

Juxta articular nodules have been described as occurring in the tropics in several conditions other than leprosy, which in this case was probably an accidental coincidence. The nodules are usually symmetrical distributed on the extensor surfaces and in the neighbourhood of the joints. Histological examinations of the nodules by different observers showed a very varying picture, but in one previous instance there was evidence of a fungus. The present paper reports another case of a mould being apparently the cause of two such nodules on the ankle of a native Hawaiian man, the subject of leprosy. The mould was identified by cultural experiments as an *Aspergillus*, whose species the authors are unable to identify.

E G G L

- ESCOMEL (E) **Mycose s' attaquant à des rongeurs du genre *Mus*, a Arequipa, Pérou**—*Bull Soc Path Exot* 1919 July 9 Vol 12 No 7 pp 350-353

Escomel reports a remarkable case of a mouse attacked by a fungus which had destroyed the skin of the face and head, the eyes, part of the ears, one nostril, and part of the upper lip, the fungus actually having invaded the underlying bone, notwithstanding this the mouse was remarkably fat, and showed no symptoms of illness. The fungus was demonstrated to be of the group Hyphomycetes, the genus *Malassezia* of Brumpt.

E G G L

- SCHAMBERG (Jay Frank) **Desensitization of Persons against Ivy Poison**—*Jl Amer Med Assoc* 1919 Oct 18 Vol 73 No 16 p 1213

Schamberg reports remarkable results in the treatment of individual susceptibility to rhus poisoning, and thus describes his method. A somewhat increased dosage is recommended in combating an actual attack of the poisoning. It is obvious that the cause of the dermatitis must be established first without doubt, and it is suggested that similar

tinctures of the respective plants concerned may be useful in eruptions and other forms of plant dermatitis

The method of treatment is as follows —

R. Tincture of <i>Rhus Toxicodendron</i>	10
Rectified spirit	5 "
Syrup of orange, sufficient to make	100 "

The patient is instructed to take the mixture in half a glass of water, as follows —

Breakfast drops	Lunch drops	Dinner drops
1	2	3
4	5	6
7	8	9
10	11	12
13	14	15
16	17	18
19	20	21

When this dosage has been reached, for purposes of convenience and simplicity, the patient takes a *teaspoonful* in half a glass of water merely *once a day*. This should be continued throughout the dry season.

It has been the author's experience that the immunity (if one can call it such) established after one month's administration will persist for about a month afterwards. After this, susceptibility is prone to return.

E G G L

ROBERT (Léopold) *L'Ulcer Tropicum* (Revue et faits nouveaux) —
Med Jt of Siamese Red Cross 1918 Dec Vol 1 No 3
 pp 542-580 With 8 figs

The author reviews the history of this affection and suggests the restriction of the name to *ulcer tropicum*, including the topographical variations, under which different authors have written of the subject. Two types are described according as the ulcer is phagedenic or torpid, the former being of graver significance. The site of election is the lower limb, especially the foot, but it may occur on any part of the body. Malaria seems to play a most important part in predisposition to the infection. This is regarded by the author as definitively due to the symbiosis of VINCENT, the fusiform bacillus with a spirillum, which has been demonstrated by VINCENT to be the cause of the throat affection known as Vincent's angina. The characters of these organisms are fully described. Their culture is difficult, they are both strictly anaerobic, and require a special medium containing, e.g., ascitic fluid, the cultures reproduce the fetid smell characteristic of the disease. Inoculation in animals usually fails to produce the specific disease, but VINCENT succeeded in inoculating tuberculous rabbits with characteristic ulceration of Vincent type. The author's personal contribution seems to be limited to the examination of two unstained specimens furnished to him by MENDELSON, in which he was able to demonstrate the symbiosis. The Wassermann reaction, if the antigen used is a watery extract, is positive in 86 per cent of the cases of tropical ulcer without any syphilitic antecedents, so that the antigen should always be an alcoholic extract, in which event the proportion

of positive reactions drops to 3 per cent (SCHULLNER). The best treatment in the author's opinion, in which he confirms BOUFFARD, is local application of *neosalan* or its substitutes. In default of this, Vincent's hypochlorite powder is the next best.

E G G L

SAIGON (Felix) **Traitement de l'ulcère phagédénique par le pansement de Vincent**—*Bull Soc Path Exot* 1918 Dec Vol 11 No 10 pp 827-832 With 1 plate

The author describes a dressing of phagedenic ulcers which he has utilised in 122 cases with satisfaction. The following is the routine adopted. The ulcer is cleaned up on admission and bathed for two hours in a hot lotion, 38° to 40°, of 1/4000 pot permang and a boiled-water dressing applied. The second day a second bath of permanganate is given and debris and slough removed with scissors or curette. The wound is then abundantly powdered with Vincent's powder, consisting of fresh hypochlorite of lime, 10 parts, to 90 parts of powdered and dry boric acid. On the third day the permanganate bath is repeated for an hour and if possible the wound is exposed to sunlight. When quite dry the wound is again filled with Vincent's powder, covered with an aseptic dressing, and the patient kept in bed. This procedure is kept up until the ulcer is healed. In the latter stages, when the infective factor has disappeared, it may be advisable to stop the Vincent powder and to give daily irrigation with physiological salt solution and cover with a dressing of powdered zinc oxide or a wet dressing of 1 per cent picric acid.

E G G L

VINCENT (H) **Le traitement de l'ulcère phagédénique par le pansement sec hypochlorité**—*Bull Soc Path Exot* 1919 Feb Vol 12 No 2 pp 64-65

The dressing used was dry hypochlorite of lime, diluted with dry boric acid (1-13). The ulcers, before the dressing is applied, should be cleaned with boiled water and dried carefully.

E G G L

BLONDIN **Note sur un traitement des ulcères phagédéniques**—*Bull Soc Path Exot* 1919 June 11 Vol 12 No 6 pp 296-298

The author notes that fracture of the bone may result from extensive tropical ulceration without ascertainable traumatic cause. The treatment here recommended after considerable personal experience is continuous irrigation of the ulcer, for 8 hours daily, with a solution of Javelle water* (6 per cent) dripped on the ulcer at the rate of 15 drops per minute. It is claimed that after two to three such seances of 8 hours the ulcer is clean enough to allow of the dressing with "ordinary antiseptics" (not otherwise specified).

E G G L

* *Liquor sodae chlorinatae*

BODET Note sur quelques cas de pseudo-myiase rampante ou pseudo-draconculose, observes a Tamatave — *Bull So Path Exot* 1918 Oct Vol 11 No 8 pp 716-722

A paper founded on the observation of eight cases of a condition simulating a myiasis and known locally as Senegalese worm but so far no parasite has been identified with it. The author regards the condition as approximating to the affection described by BLANCHARD as Oelbis or 'pseudo myiase rampante'. The clinical symptoms are surprisingly constant and may be summarised as follows. A line of vesication develops very rapidly and follows a sinuous course, of several centimetres in length, with the foot as site of election, accompanied by intense itching but by no inflammatory reactions. The linear swelling when excised is found to contain clear fluid, occasionally opalescent, and heals with slight exfoliation in the course of the line, but leaves no scar. No trace of a parasite could be found, but the author notwithstanding considers it probable that the cause is to be found in "an insect such as *Pulex peneti*ans" and ventures the hypothesis that a non-fecundated female of this species imprisoned in the skin and not undergoing the normal ovulation actually burrows the channel in the attempt to find an exit.

E G G L

FULLEBORN (F) & DA ROCHA-LIMA (H) Ueber Larbisch und Wolossjatk (Hautmaulwurf) — *Arch f Schiffs- u Trop-Hyg* 1919 July Vol 23 No 13 pp 259-277 With 6 figs

The authors discuss the relations of a Russian affection known as Wolossjatk with Larva migrans, or creeping disease of Western authors, which latter has been frequently demonstrated to be caused by a larva, probably a *Gastrophilus*. German authors have adopted the title "Hautmaulwurf". The authors regard the Russian disease as probably the same as the "Hautmaulwurf" of SAMSON and HIMMELSTJERN, and in fact adopt this title. The clinical features are thus described. A red line forms 1-4 mm wide, and growing in a few hours to a length of several centimetres, with irregular windings and intense itching of the growing end of the line. It may occur on the mucosae as well as the skin. Other larvae besides that of *Gastrophilus* have been incriminated by various authors, e.g., ancylostoma, strongyloides, filaria, sandfly, etc. The authors' personal contribution to the question chiefly lies in the observation of a specimen of a negro skin sent to them from Togoland by Dr SIMON, with the clinical diagnosis of "Hautmaulwurf," which the histological investigations of the authors established as in their opinion exactly the same disease as the Larbisch of West Africa. No parasite or evidence of parasitic passage was obtained. The channel, which has been assumed to be caused by the passing of a larva, was found to be large enough to accommodate a *Gastrophilus* larva. The channel was found to be filled with a homogeneous mass staining red with eosin, and the walls of the channel consisted of horn cells staining deep red with eosin. There was a rich lymphocytic infiltration of skin in the vicinity of the canal.

The authors come to the conclusion that the Russian disease is not quite identical with "creeping disease" but is indistinguishable from Larbisch or Oerbiss of French authors and that both these affections are probably caused by a *Gastrophilus* larva.

E G G L.

SIRENET (Edm.) & LHERMITTE (A.) **Gale du dromadaire (Première note)**—*Bull Soc Path Exot* 1919 Feb Vol 12 No 2 pp 94-99 With 5 figs

The dromedary must now be added to the long list of animals affected by a special *Sarcoptes*, the character of which has been carefully studied in this paper. Fifteen camels were concerned, all died within three months, but the author suggests that the treatment (which included washing the entire body with hot water) may have been imprudent, the camel being peculiarly susceptible to damp.

The clinical symptoms are fully described. The acarus makes no burrows, attacks by preference the lips, axillary fold and axillae, produces depilation, scaly crusts fissuring of the skin, extreme itching and cachexia. The parasite is readily transmitted to man, twelve of the attendants having been attacked. The symptoms in the human being are very similar to those in the animal and include a serious depression of the health, and intractability to treatment.

E G G L.

O'CONNOR (F. W.) **An Outbreak of Itch due to a Predaceous Mite occurring in England amongst Men engaged in unloading Cotton Seed from Egypt**—*Trans Soc Trop Med & Hyg* 1919 May 16 Vol 13 No 1 pp 10-12 With 1 plate

The mite in question is *Pedunculoides ventricosus*, one of the *Tarsonemidae*. In this case it was extensively infesting the caterpillars of a Tineid moth, *Gelechia gossypiella*, with which in turn a cargo of cotton seed was extensively infested. The mites very actively attacked the dockers who handled the seed, causing a copious rash and most intolerable itching. The author satisfied himself, by a magnanimous experiment on his own person, that it was the mites themselves, and not any intrinsic product of the caterpillars that caused the painful and alarming symptoms. The classical treatment for ordinary itch was successful.

A Akcock

ANJO (N.) **[Eruption of Farmers ascribed to working in Liquid Manure]**—*Tokyo Iri Shinji (Tokyo Med News)* 1917 Dec 15 No 2054 pp 2575-2577

[From Review by R. G. MILLS.]

A pruritic eruption of the hands and feet common in Japanese farmers from May to October has been noted, especially in damp surroundings. Secondary impetigo is usual, and a subsequent expectoration of bloody sputum accompanied by violent cough. Histological examination showed "worms penetrating the skin" which are inferred to be hookworm larvae.

E G G L.

KAMBAIYASHI (T) Ueber das Wesen von *Pompholyx* und ihren Erreger, besonders ueber *Trichophytia interdigitalis* und die Pilzarten als ihren Erreger. [In Japanese. Author's summary in German pp 38-39].—*Jap Ztsch f Dermatologie u Urologie* 1919 Sept Vol 19 No 9 p 789

The author protests against the ascription of all cases of pompholyx to a hyphogenic cause, and contends that there is a group of diseases characterised by vesicular eruptions especially of the hands which is idiopathic, that is not due to fungus. He bases this view on the argument that the fungus cannot be found with the most careful search in many cases, that this type does not yield to antiseptic treatment which is so effective in the fungous diseases, the limits of disease are not well defined and there is less scaling. A rather unexpected result of his investigation of the fungous type is the finding that trichophyton was greatly more prevalent than epidermophyton, and this is especially remarkable in the toe cases, fifteen of which are described and in all a trichophyton was found.

E G G L

NICOLL (Charles) & COLLABORATORS. Sur dix cas de Xeroderma pigmentosum observés en Tunisie.—*Bull Soc Path Exot* 1919 July 9 Vol 12 No 7 pp 391-393 With 1 map

This paper is based on a personal observation of seven cases, in 16 years experience, with an addition of three cases reported (but not seen) as occurring in relatives of the patients observed; eight of the ten cases occurred in natives—six were contributed by one collaborator practising as an ophthalmic surgeon, the disease having affected the ocular region in the great majority of cases. A report on the microscopic characters of the lesions is promised for a later paper.

E G G L

VAN DEN BRANDEN & VAN HOOI. Un cas de "maladie de dépigmentation" chez une Indigène du Congo Belge.—*Bull Soc Path Exot* 1918 Dec Vol 11 No 10 pp 867-868

The case here described was one of acquired and progressive depigmentation, which could be distinguished from vitiligo, in a native woman otherwise in excellent health. The affected patches were quite painless, and not itchy. The hairs of the parts attacked were deprived of pigment as well as the skin.

E G G L

CLARENC (H) Sur le Molluscum fibrosum.—*Bull Soc Path. Exot* 1918 Dec Vol 11 No 10 p 813 With 1 plate

This is a short note accompanying two excellent photographs of a case of Molluscum fibrosum [dermatolysis] affecting the left arm.

E G G L

AMOEBIASIS AND DYSENTERY

AMOEBIASIS

TURNER (O Polhill) & TAYLOR (Noel) **Preliminary Report Concerning the Examination of 3277 Patients for the *Entamoeba Histolytica* and Treatment of 281 Carriers with Bismuth Emetine Iodide, also Special Notes with Reference to the Carriers of Small Cysts**
Jl Roy Army Med Corps 1919 Sept Vol 33 No 3
 pp 245-250

The total number of post-dysenteric patients examined was 3277 from September 1916 up to December 31, 1917, out of which total 15.4 per cent were carriers of *E. histolytica*, vegetative forms as well as cysts being included, *E. coli* totalled 19.5 per cent, *Giardia intestinalis* 10.4 per cent, *F. nana* 2.6 per cent, Iodine cysts (*Iodamoeba butschlii*) 2.3 per cent. The majority of men (2249) hailed from France, the remainder from the East (Salomea), Mesopotamia, and East Africa. The incidence of *E. histolytica* was 11.4 per cent, in the former, and 24 per cent in the latter groups. 22 per cent of the infected individuals had never been to the tropics in their lives before. Of 366 carriers of cysts of *E. histolytica* on admission to Addington Park War Hospital:

175 bore the uncompromising diagnosis of dysentery,

133 were labelled "amoebic,"

49 were labelled "bacillary" dysentery

9 were cases of enterica

Under emetine bismuth iodide treatment after either one, two or three courses 77 per cent cleared up. Of 366 carriers it is to be noted that 67 did so without treatment of any kind and 84 resisted all forms of treatment. Further details on this point are of interest. 57.4 per cent cleared up after one, 71.8 after two, and 75.7 per cent after three such courses.

On transference to the convalescent home, out of 770 men with no previous history of amoebic dysentery, who had given two "negative" tests at a previous date, 4.7 per cent were afterwards found to be carriers of that infection. [This paper contains a mass of statistical information of the variety that is now familiar as the result of war protozoology. These are of undoubted utility as a means whereby inferences may be drawn by comparison, but it must be admitted that they are uninteresting reading.]

P. H. Manson-Bahr

HILL (Athelstane) & WALTON (Janet) **Upward Enlargement of the Liver**—*Jl Roy Army Med Corps* 1919 Nov Vol 33 No 5
 pp 391-403 With 5 charts

This entirely clinical paper deals with the signs of upward enlargement of the liver, due to various causes and their interpretation in thirty-one cases. Their aetiology is as follows—

Definitely amoebic	17	Tuberculous peritonitis	
Undetermined	8	with adhesions	1
Malaria	3	Post-operative jaundice	1
Malaria with pyaemia	1		

The cardinal signs are —

- (1) Displacement of the heart upward to the *left*
- (2) An abnormally high liver dullness
- (3) The appearance of areas of impairment in certain part of the lung and liver, due apparently to relaxed tension

To map out the heart and liver, it is not necessary to use either very light or very heavy percussion — a sharp rise in pitch indicates, so the authors believe, the edge of the organ quite accurately apparently as an X-ray examination

In such an examination the upper limit of liver dullness during quiet breathing is just crossed by the shadow of the diaphragm at the end of normal expiration, this can be made out in front and in the normal chest, this line begins at the fifth rib. In conditions in which the liver is enlarged upwards the percussion note in the *fourth* space is of higher pitch. At the back, in normal conditions the percussion note gradually becomes lower from apex to base till the level of the tenth spine is reached. Absolute dullness begins at the level of the eleventh spine, or just below it. When the liver is enlarged upwards, the limit of impairment begins at the level of the eighth or ninth spine — usually also these other signs are present —

(a) Lowering of Goldscheider's line (upper limit of resonance close to the vertebrae)

(b) Retraction of Krong's isthmus (band of resonance between the mastoid and acromion processes) and blurring of one or both margins

(c) A patch of impairment about two inches to the right of the third and fourth vertebral spines

When the liver is much enlarged, or in case of left lobe abscess, the signs may be better marked on the left than on the right side

Accompanying charts illustrate these several points. There is little else in the paper which calls for comment except that these rather ephemeral minor distinctions in percussion notes, appreciable perhaps only to trained ears, in every case require an X-ray examination and a laboratory diagnosis for confirmation

P H M B

GUNN (J W C) & SAVAGE (R E) **Report on the Treatment of *Entamoeba Histolytica* Infections.** *Jl Roy Army Med Corps* 1919 Nov Vol 33 No 5 pp 418-426 With 1 chart

Between February 1917 and December 1918, 385 cases of *Entamoeba histolytica* infection were treated in the 19th General Hospital, Alexandria and this paper embodies attempts to determine which form of ipecacuanha treatment yields, on the whole, the most satisfactory results

Naturally this series comprised cases of every degree of severity 144, or approximately 37 per cent, were acute with blood and mucus stools and active entamoebae containing ingested erythrocytes. Fever in some of these cases was present on admission, rarely above 101° F., or persisting for more than three days. A septic evening

temperature, in infections that have remained without treatment for some considerable time, is not uncommon. These may be due to a superadded infection with *Bacillus coli*. This was specially noticeable in one fatal case illustrated by a temperature chart.

In the remaining 239 cases, or 63 per cent of the series, *E. histolytica* was present in the encysted form only. Some had few symptoms; others had primarily been amoebic cases, but there were no healthy carriers. What pathological condition is present in the bowel of the cyst carrier is very uncertain; many writers, apparently on inadequate grounds, have presupposed an actual ulceration of the bowel, but CAMPBELL, pathologist to the Alexandria district, has performed autopsies on cases well known to be carriers without being able to find any naked eye intestinal lesion.

Treatment—The stools of all patients were examined several times during treatment and four to seven times weekly after treatment was concluded. The patient was discharged if no relapse occurred for a month after discontinuation of specific treatment.

1 The earliest cases received some form of ipecacuanha treatment for twelve days together with general measures, and occasionally, if required, enemata of 1 2,000 copper sulphate, or 1 2,000 quinine hydrochloride with 1 drachm of liquor adrenalin.

Series A, 21 cases were injected daily with emetine hydrochloride for twelve days. Amongst these were four acute cases, of which only one could be regarded as cured. Eleven out of seventeen carriers were cured by these means.

Series B, of 24 cases, received emetine and bismuth iodide, three grains daily by the mouth for twelve days. Four acute cases were cured out of a total of ten, and nine carriers out of fourteen.

Series C, of 12 cases, received one grain of emetine by the hypodermic route and emetine bismuth iodide three grains daily by the mouth for twelve days. Five acute cases were cured, one relapsed, and all six carriers were cured. With this treatment the authors are more or less satisfied though they consider it rather "rough" on the patients who became weak, depressed and emaciated.

Series D, consisted of sixteen patients who received one gram of emetine hypodermically and ten grains of ipecacuanha in pill form daily for twelve days.

This was better tolerated though the curative results were not so good; two out of the more acute cases, and none out of the twelve carriers being cured.

2 **Specific Treatment for 26 days**—Consisted of hypodermic emetine for twelve days, followed by oral administration of emetine bismuth iodide for fourteen.

Series E, 92 cases, the daily dose of the double iodide was two grains and a larger proportion of cures of acute cases was obtained than with any other method—those which relapsed did so as cyst carriers without symptoms. 58 out of 68 cyst carriers were cured.

Series F, 218 cases received three grains of the double iodide and 103 out of 122 cyst carriers were cured. If a case relapsed, a second course was given after an interval of two weeks.

Pyrexial cases generally had a concomitant hepatitis and all symptoms soon disappeared with a judicious dosage of emetine.

TABLE IV

GUNN & SAVAGE]

	British Troops					Egyptian Soldiers	British	Egyptians
	1916 July 30- Dec 31	1917	1918	1919 January 1 March 31	Grand Total July 30 1916- Mar 31 1919			
		No 3 131	No 3 037	No 400	No 168			
Total cases	955	1 322	1 451	146	3 823	85	44.2	Average 1918 to March 1919 35
Negative	298	1 225	968		2 635	70	35	
Blood and mucus								
<i>Entamoeba histolytica</i> (with red cells)	18	49	116	41	214	11	3	55
<i>coli</i>	44	117	147	35	343	0	4.5	0
<i>Lambia</i> (<i>Guardia</i>) <i>intestinalis</i>	147	304	300	36	787	5	10.3	2.2
<i>Tetramitus</i> (<i>Uhlomastix</i>) <i>mesnili</i>	120	270	226	31	647	2	8.4	1
<i>Trichomonas hominis</i>	88	118	123	5	334	0	4.3	0
<i>Entamoeba nana</i>	57	102	98	22	279	4	3.7	2
" (undiagnosed)	17	135	40	4	199	1	2.6	0.5
<i>Waskia intestinalis</i>	39	83	61	7	190	1	2.5	0.5
<i>Coccidium isospora</i> (? sp.)	—	1	—	—	1	0	—	—
"Iodine" cysts	6	3	5	—	14	0	0.2	—
Worms —	5	21	19	6	51	2	0.6	1
<i>Trichocephalus dispar</i>	15	27	20	3	65	0	0.9	0
<i>Ascaris lumbricoidea</i>	2	8	17	3	30	28	0.4	14
<i>Angiostomum duodenale</i>	1	4	11	—	16	24	0.2	12
<i>Oxyuris vermicularis</i>	—	2	—	—	2	0	0.02	0
<i>Bitharzia haematobium</i>	—	2	2	—	4	21	0.05	10
<i>Taenia saginata</i>	—	1	3	1	5	1	0.07	0.5
<i>Taenia nana</i>	—	—	—	4	4	0	0.05	0
Total stools examined	3 941	11 775	9 617	483	25 816	202	—	—

The following summary of the years 1917 and 1918 is of interest

Bacillary	1,437
Amoebic or mixed	429
Unclassed	446
	<hr/>
	2,312
	<hr/>
Deaths Bacillary	10
Amoebic	8

In conclusion the authors recommend that acute cases be treated with one grain of emetine daily for twelve days, followed by three grains of emetine bismuth iodide for fourteen. If the condition be severe they recommend an intensive course of one grain of emetine hypodermically in the morning and two or three grains of emetine bismuth iodide at night. Carriers which relapse after treatment should be discharged, if they have no symptoms they should be warned about the disposal of their faeces and an entry should be made in their pay book so that any sequelae which may possibly ensue (such as liver abscess) may be guarded against. An appendix to the paper contain such important statistics that they are reproduced in full.

In 1918 there was a higher proportion of both amoebic dysentery and carriers in the EEF. During the first three months of 1919 this increase was maintained, it was during that period of the year that the proportion of amoebic cases was always at its highest. [One is full of admiration for this paper, undoubtedly one of the most important war studies of its kind, based, as it is, upon such a fund of material. The final statistics are of immense value to any official publication in connection with the war. Those interested should consult the original, so terse, so crisp, and in every way so readable, not always the case in productions of the same kind.]

P H M-B

HAUGHWOUT (Frank G.) & LANTIN (Pedro T.) With an Addendum by ASUZANO (M. A.) **Protozoologic and Clinical Studies on the Treatment of Protozoal Dysentery with Benzyl Benzoate. I—A Preliminary Report on Eight Cases of Endamebic Dysentery and One Case of Bacillary Dysentery treated at the Philippine General Hospital.**—*Arch Intern Med* 1919 Oct 15 Vol 24 No 4 pp 383-397

This paper deals mainly with the treatment of amoebic dysentery with benzyl benzoate in 20 per cent alcoholic solution. In the differential diagnosis of intestinal amoebiasis from bacillary dysentery the authors seem to be fully cognizant of the pitfalls into which the unwary may fall. The limitations of the diagnosis of the latter disease, proved bacillary by isolation of the specific bacillus, are recognized, and the value of a cytological diagnosis for practical purposes emphasized.

With these preliminaries, in order to obtain as accurate a diagnosis as possible the authors recount their experiences with 9 cases, one of which had a coexisting bacillary infection. Under this treatment (benzyl benzoate), 20 drops three times a day, to cases of varying severity, all endamebas (*sic*) disappeared from the stools as the general symptoms subsided. Whether this disappearance is temporary or

permanent remains to be decided, but there is reason to believe that the drug possesses amebicidal properties, this has already been suggested by MACHT and FISHER in experiments *in vivo*.

The authors consider it safe to say at any rate that it is a valuable auxiliary to other forms of anti-amebic treatment and it is agreeable to take. It is unwise to push the drug in acute cases to a point where the patient becomes constipated, it takes the place of morphine in that it slows the peristalsis and relieves the pain and tenesmus. It exerts no effect upon intestinal protozoa other than *Endameba dysenterica* (sic), neither are intestinal helminths affected by it. It should be noted that the drug was given in association with pulv. ipecac, and the authors suggest that there is a possibility of synergistic action between benzyl benzoate and ipecacuanha and its alkaloids. Its action upon chronic or cyst carrier cases, and in hepatitis of amoebic origin has not yet been tried.

The addendum by Asuzano, two cases of endamebic dysentery at Bagnio Hospital treated with benzyl benzoate, provides a little more information. One received emetine injections and emetine bismuth iodide in addition to benzyl benzoate, while the other was treated with the latter alone and all symptoms rapidly disappeared and with them the amoebae in both the trophozoite and encysted stages.

P H M-B

SAENZ (Cornelio A) **Tratamiento de las amebiasis emetineresistentes por el neosalvarsan.** [Treatment of Emetine-Resisting Amoebiasis by Neosalvarsan]—*Ciémica Med*, Lima 1919 Mar Vol 36 No 669 pp 84-90

The author contends that cases of amoebiasis of whatever form, which prove resistant to emetine, should be, without delay, treated by arsenic in the form of neo-salvarsan. Emetine is the treatment of election if the amoebae present are in the motile state. It is often, however, powerless against the encysted form of the organism and it may induce encystment, as a defensive measure on the part of the amoeba, in cases it fails completely to cure. In all cases in which cysts are found arsenic should be employed. Clinical histories are given of cases cleared up by neo-salvarsan after failure or relapse under emetine.

F S Arnold

TALBOT (Philip) **Fifteen Cases of Liver Abscess. An Analysis of Symptoms and Treatment.**—*Brit Med J* 1919 Sept 20 pp 375-376

This paper is an analysis of signs, symptoms and treatment of 15 cases of hepatic abscess which came under the author's care at Baghdad.

The outstanding diagnostic signs in the series were

- (1) General enlargement of liver,
- (2) Pyrexia, either continuous or remittent,
- (3) Leucocytosis of 18,000,
- (4) A local tender spot over the liver,
- (5) Signs of irritation at base of right lung, in all but two cases,
- (6) Rapid wasting, in all but one case,
- (7) Heavy sweats in every case with three exceptions.

Signs and symptoms of less diagnostic value were —Local bulging, pallor, rigors, referred pain in right shoulder, rigidity of right rectus

Four of the early cases were treated by open operation and one died immediately after from pulmonary embolism, the remaining 11 were aspirated by an ordinary 20 cc glass syringe through the chest wall. After aspiration every patient was given emetine hydrochloride injections until 12 or 14 grains had been reached. In three cases the abscesses were multiple. In the author's opinion the majority of cases of hepatic abscess can be treated more satisfactorily by aspiration and emetine therapy than by open operation.

P H M-B

PONTANO (Tommaso) *Alcuni criteri di diagnosi dell'ascesso epatico amebico e le indicazioni alla cura medica* [Some Diagnostic Criteria of Amoebic Liver Abscess and Indications for Medical Treatment]—*Policlinico* Sez Med 1919 May 1 Vol 26 No 5 pp 169-186 With 3 figs

SIMONCELLI (Guido) *Sulla cura medica dell'ascesso epatico dissenterico*—*Ibid* June 1 No 6 pp 222-236

PONTANO (T) *Risposta alle critiche del dott Simoncelli "Sulla cura medica dell'ascesso epatico dissenterico"*—*Ibid* pp 236-239

Pontano's paper expresses a plea, in the making of a diagnosis, for the detailed study, macro as well as microscopic, of liver abscess pus in the absence of entamoebae.

Simoncelli criticises Pontano's views at some length, throwing doubt on his diagnosis in the cases of amoebic abscess he reports as cured by emetine injections without surgical interference and protesting vigorously that to withhold surgical treatment in these cases can never be justifiable. Pontano replies maintaining his original contention.

P H M-B

DE MELLO (Froilano) *Notes cliniques sur un cas d'amébiase urinaire.*—*Boll Ger Med e Farmacia* Nova Goa 1919 Aug Vol 5 No 8 pp 296-300

This is a record of a supposed case of urinary amoebiasis occurring in a boy of six years of age in Portuguese India. The patient was otherwise in normal health without any previous history of diarrhoea or dysentery. The urine was bloodstained and contained large numbers of amoebae and cysts, both uni- and quadrinucleate, mention is made that some of the latter contained even more than the prescribed number of nuclei. The organisms were said to be slightly active and to correspond in every way to type, but the child got well on salol and sodium bicarbonate treatment. A summary of previously recorded cases is given. [The reviewer shares with DOBELL ("The Amoebae living in Man," p 128) a considerable amount of scepticism of the hitherto recorded cases of urinary amoebiasis. The gist of the matter is that many of the body cells, especially the pyriform cells and macrophages derived from the urinary mucosa, swell up by

osmosis in the urine and bear a rough resemblance to dead amoebae. This is the probable explanation of the structure figured by CHALMERS and O'FARRELL (*Jl Trop Med & Hyg*, Vol 20, 97), in the Manual of Tropical Medicine of CASTELLANI & CHALMERS, 3rd edition, fig 779, and many others. Moreover we have almost definite information from amoebic blood-and-mucus stools contaminated with urine that *Entamoeba histolytica* is unable to move and have its being in the latter medium]

P H M B

CROPPER (J W) An Enumerative Study of *Entamoeba coli* Cysts in Stools (Marcus Beek Laboratory Reports No 8)—*Proc Roy Soc Med* 1919 Vol 12 No 9 pp 1-14

This paper contains a vast amount of work and aims at a method by which the examination of protozoal cysts daily excreted may be accurately gauged and estimated. For this purpose the author has devised a Protozoometer*—a slide 3"×1½" ruled in columns ½ mm wide parallel to its length, and by forming a ring of paraffin and applying a coverslip an efficient counting chamber may be established. *E. coli* cysts were selected as being particularly suitable test-objects. The procedure necessary consists of—(1) Making a uniform stool emulsion, (2) Counting the cysts in the emulsion.

The first is not such an easy matter as might appear, any violent methods are liable to damage the cysts. Two grms of the stool are washed into a mortar and emulsified with a pestle, then decanted into a 100 cc cylinder fitted with a rubber cork. Repeat till the whole of the stool has been dealt with and make up to a volume of 40 cc. This makes a 5 per cent emulsion which gives the requisite density. The cysts are counted by taking 20 cmm of the resulting fluid and placing in the counting chamber—no iodine should be added.

By the method it is found that the number of cysts excreted daily varies enormously. The lowest recorded count was 3,250 cysts per gramme of stool, the highest 323,690, the number excreted in a single day varied from 290,000 to 64 millions.

The experimental errors in this method may be due to several causes—(a) The use of the pipette, (b) The personal factor, (c) Random sampling.

Concentration methods can be carried out with an inappreciable loss of cysts, at the same time they enhance the value of centrifuging for diagnosis. The procedure is as follows—10 cc of a 10 per cent aqueous emulsion of stool are placed in a graduated centrifuge tube, about 15 cc capacity and centrifuged for 2 minutes. The upper 7.5 cc is poured off and the whole made up to 10 cc again with water and the mixture well shaken. The process is repeated three times in all and the deposit finally made up to 2.5 cc.

The rate of degeneration of *E. coli* cysts in different stools varies enormously. The greatest loss in numbers on keeping was found to occur in soft stools, in which the cysts were thin-walled and less resistant to extraneous circumstances.

P H M-B

* Figured in the preceding Number of this *Bulletin*.

FISCHER (Walthel) **Das Blutbild bei Amobendysenterie.** [The Blood Picture in Amoebic Dysentery]—*Deut Med Woch* 1919 Sept 4 Vol 45 No 36 pp 991-992

This paper is dated Shanghai July 1918 After quoting the rather varied statements made by different authors upon the blood picture in amoebic dysentery the author gives his results in thirty uncomplicated cases of amoebic dysentery which is as large a series as has been so far published In two-thirds of the cases there was a moderate hyperleucocytosis of 10,000, a leucopenia never As regards the differential count the large mononuclears were rather below the average, 51 per cent, which is identical with the figure obtained from a similar series of normal Chinese of the same sex, age and social class [These figures are in direct contrast to those given by CASTELLANI and CHALMERS in their Manual—namely a hyperleucocytosis of 20,000 with a definite rise of the eosinophiles, even in the absence of any helminthic complication]

P H M-B

DA CUNHA (Aristides Marques) & DA FONSECA (O) **Sobre a *Entamoeba serpentis***—*Mem Inst Oswaldo Cruz* 1918 Vol 10 No 2 pp 95-98 With 1 plate [English Translation at pp 75-77 of Second Section]

The species most nearly related to *Entamoeba serpentis* is one described by HARTMANN under the name of *E testudinis*, but there is no dimorphism as in the one under review

Another species in reptilia is *E laceptae* (HARTMANN and PROWAZEK), its small size and a peculiar division of the nucleus is noted This species has been more fully studied by DOBELL

P H M-B

HAIG (H A) Notes on Amoebic Dysentery from the Point of View of Microscopical Diagnosis—*Lancet* 1919 Nov 8 pp 823-825 With 6 figs

This paper contains no new information, but is an account of the morphology of *Entamoebae histolytica* and of the microscopic diagnosis of amoebic dysentery on generally accepted lines

P H M-B

BACILLARY DYSENTERY

MEDICAL RESEARCH COMMITTEE National Health Insurance Special Report Series, No 40 **Studies of Bacillary Dysentery occurring in the British Forces in Macedonia** [Edited by Colonel Leonard S DUDGEON]—1919 London H M Stationery Office [Price 3s net] 83 pp With 2 charts & 1 text-fig

The report commences with an account of the composition of the media utilized in cultivation of the bacillus and the preparation of dysentery antigens Sera immune to the various strains of dysentery organisms were prepared locally from goats and rabbits

For absorption tests, to a 2 cc of antiserum, diluted 1:10, a thick emulsion of 1 cc of a dysentery bacillus was added and this was repeated at a further interval of three hours The reaction was allowed to continue for 9 hours at 55° C

The necessity of obtaining fresh specimens of blood and mucus stools, free from any faecal contamination, is fully appreciated by Col Dudgeon and his co-workers and the high percentage (76.24 per cent) of positive results obtained from cultures of such stools in a laboratory near the front line compares favourably with statistics from hospitals and laboratories near the base.

Working upon the same lines as Lucius NICHOLLS in his research upon the effects of acid media upon the cholera vibrio the Salonika workers were able to show that it is to the production of acid in a decomposing dysentery stool that the rapid disappearance of the dysentery organisms is due. By adding an equal quantity of 3 per cent normal soda solution their viability could be greatly prolonged and thus a method was suggested of transmitting faeces to a distant laboratory with a more reasonable hope of success as regards positive culture. Experimental evidence was obtained that *young cultures* of the dysentery group are able to multiply in 2, 4, 5, and even 6 per cent of normal caustic soda. In subacute and chronic cases the percentage of positive isolations was rendered by this method eminently satisfactory.

The results of haemocultures in a large series of cases (145) are of great importance. 2.5 cc of blood were added to 20 or 30 cc of either 2 per cent bile salt in distilled water, or 1 per cent glucose citrate broth. In two cases only, both acute Flexner dysentery, was the Y bacillus recovered from the blood stream. As regards the cultural tests when applied to the dysentery group, it was found that when 140 strains of the Flexner group were submitted to prolonged cultural tests certain characteristics emerged which could be considered *primary* or constant, and *secondary* or inconstant. The secondary characteristics were as follows: their reactions with cane sugar, maltose, dextrose and milk, indol production and haemolytic action; their primary constant characteristics were defined as the Gram negative staining reaction, the lack of motility, their inaction with lactose and the constant production of acid from glucose and mannite. This indeed is a source of joy to future bacteriologists and henceforward they may regard these five biological reactions as their mainstay.

The variation in the reaction of members of the group to serological tests rendered their definition a matter of great difficulty. All the strains were agglutinated by the specially prepared Flexner serum, and all but one reacted with both sera. The absorption test showed in all cases a reduction in the agglutinin content of the sera or complete desaturation.

The conclusions arrived at on this important part of the report may be recorded shortly as follows.—It would be advantageous to regard all mannite fermenting organisms as Flexner bacilli, thus further subdivision into "labelled" strains is not recommended. Ample investigation of "inagglutinable" Flexner strains is necessary so as to observe the relationship which the bacilli possess to the true Flexner organisms and to ascertain whether they are able to excite dysenteric lesions under experimental conditions. At present it is suggested that they may be divided as to their serological reactions into five types (as recommended by the special War Office Committee and designated V, W, X, Y and Z), but according to MURRAY's experiments

upon intravenous injection of these inagglutinable strains into rabbits no evidence was obtained that the division of these types is a sharp one

As regards the true Shiga bacillus no evidence was obtained that any of the strains isolated departed in any way from type It was noted that immunization of rabbits in the preparation of anti-Shiga serum could be effected with greater safety if formalin-killed vaccines were employed in place of bacillary emulsions killed by heat On the other hand with para-Shiga bacilli (to be referred to next) bacilli heat-killed produced the most satisfactory anti-sera The para-Shiga were obtained in 41 instances, they could be sub divided into two groups, the para-Shiga+ and the para-Shiga-, according to the power of forming indol Anti-Shiga serum was not absorbed by either of the organisms All were Gram-negative and non-motile and were probably identical with organisms isolated by SCHMITZ in 1916

In the immunisation of rabbits against this organism it was found that agglutinins were not formed so readily as in the case of the true Shiga bacillus Inoculation experiments upon rabbits with these organisms failed, but direct inoculation into the intestinal canal proved that no clinical evidence of dysentery was produced during life, but in one animal intestinal ulceration was present post-mortem Direct inoculation of the true Shiga bacillus into the intestinal tract produced clinical evidence of dysentery in one rabbit which died in twenty-four hours, the bowel was acutely inflamed but not ulcerated Intravenous injection invariably proved fatal even in animals previously inoculated with Shiga vaccines and apparently protected

Bacillus Morgan No 1 was frequently isolated from blood and mucus stools and fourteen strains were investigated without adding any evidence that it could be considered in any way the direct cause of disease Two of the strains produced immune bodies when injected into rabbits Agglutination however only occurred when the anti-serum and the autogenous bacillus were utilised The formalin resistance of the organism was found to be considerable, it was killed only after the addition of 0.14 per cent

MICHAELIS' acid agglutination test was investigated but was found to be useless

Arthritis affecting the large joints as a complication of bacillary dysentery was investigated in 10 cases, in 9 of which the fluid was sterile In one however *Shiga's bacillus* was successfully cultivated by Capt ELWORTHY by employing a large amount of joint fluid, which moreover was found to contain true Shiga agglutinins The Shiga bacillus was the cause of the intestinal infection in seven out of these 10 cases, the fluid bore the characteristics often noted, that is, it was limpid and contained numbers of pus cells In one case the joint fluid strongly agglutinated the Flexner bacillus The portion of the report dealing with dysentery agglutinins in human sera emphasizes the fact that immersion of the agglutination tubes in water at 55° C is more advantageous than warm air at 37° C and that an incubation period of five hours is better than three. Out of a total of 177 patients with proved Shiga infections the sera of 77 failed to react with Shiga's bacillus even in a dilution of 1:25.

The sera of the 177 acute Shiga cases were tested against Flexner antigens with the rather disconcerting result that 112 reacted in dilutions of 1 100. The conclusions derived from this work are that a positive agglutination of 1 25 suggests, but 1 40 is a sure indication of a Shiga infection. On the other hand out of 211 Flexner cases only 3 agglutinated Shiga in dilutions of 1 25. In 104 cases out of these 211, a reaction was obtained with Flexner strain (Gallipoli) in a dilution of over 1 100. Hence if this reaction is to be utilized for the laboratory diagnosis of Flexner dysentery great care must be taken to utilize a sensitive Flexner strain. In these cases one should be guided (a) by an absence of Shiga reaction, (b) by an agglutination above 1 150 and due regard must be paid to a rising titre at progressive stages of the disease. It must be confessed that this agglutination test is by no means so reliable as in the case of the Shiga organism.

The agglutinating properties in the blood of bacillary dysentery cases is rapidly lost once convalescence has become established. Out of a total of 325 convalescents 87 only gave evidence of infection. Of 34 Shiga cases 24 were found to have an associated Flexner reaction in a minimal dilution of 1 150.

The suggestion that the concomitant reactions are the result of double infections is improbable for the following reasons: (a) the frequency with which associated Flexner reactions are present in Shiga cases, (b) the absence of Shiga agglutinins in proved Flexner cases, (c) absorption tests, which were applied for the Shiga bacilli to Shiga sera proved to possess Flexner agglutinins removed both the Shiga and the bulk of the Flexner agglutinins. In some Shiga cases saturation with the Flexner strains by the absorption test caused a partial reduction in these agglutinins specific to the former bacillus. In Flexner cases it was found that though saturation with Shiga might reduce the titre, yet the agglutinins were completely absorbed by the Gallipoli Flexner strain. The latter organisms also excited, when injected intravenously into rabbits, a much greater production of specific agglutinins than did the other three Flexner strains employed.

A careful investigation was undertaken upon 8,358 convalescent dysenterics passing through a camp suitable for these cases from July 1, 1917 to October 30, 1918. Of these 195 relapsed in the dépôt. Carriers of dysentery bacilli were estimated to be 6 per cent of the total, reduced to 1.5 per cent after a period of three months.

Were the presence of mucus in the stools as indicating persistent infection more generally appreciated, the risk of carriers being discharged from hospital would be slight.

It is well to emphasize in this connection that Flexner or Shiga bacilli may be present with free amoebae or the cysts of *Entamoeba histolytica*.

From experience of this disease in Gallipoli and Macedonia the great majority of severe cases of bacillary dysentery are attributable to Shiga's bacillus and results here, as indeed elsewhere, have shown that the milder cases may be attributed to Flexner organisms. The patient's life depends upon an early recognition of his condition and adequate diagnosis of the disease and every case requires injection.

with anti-dysenteric serum at the earliest possible moment. Every case should receive a mixed anti-serum at the onset, it is suggested that all proved Shiga cases might be given anti-Shiga serum. The serum treatment of bacillary dysentery is by no means considered to be satisfactory and the deficiency of the standard sera, even that produced by the Lister Institute, in Shiga immune bodies is held to be responsible for this fact.

Col Dudgeon emphasizes once more the vast importance of early diagnosis from a microscopical examination of the stool alone and the immediate injection of anti-dysenteric serum and normal saline concurrently (see Duncan GRAHAM, *Lancet*, Jan 12, 1918, or this *Bulletin*, Vol 11, p 270). Under the most favourable conditions, and only under these, can a competent bacteriologist diagnose a Shiga or Flexner infection in 12-16 hours.

The most important fact deduced from observations upon anti-sera held in store at the Base Dépôt medical stores was that 'in date' anti-sera may be very deficient in dysentery agglutinins, especially for the Shiga bacillus.

Experiments upon the vitality of Shiga's bacillus in sterilized water, river and aqueduct water proved that from the former it can be recovered for a very considerable period, as long as 576 hours. This organism will live and multiply in stored water, especially at a low temperature. As regards chlorinated water it was proved that as long as free chlorine was no longer present the water could be easily reinfected with the bacillus. There is no doubt that it is highly necessary to protect water once boiled or chlorinated.

Finally, the report ends with a section by Captain TAYLOR on the house-fly as a carrier of bacillary dysentery. This section brings out no new points. In 50 batches of flies tested it was once more demonstrated that this insect is capable of carrying both Shiga and Flexner organisms for as long as 48 hours, though many were excreted after half that period. On the legs and wings the organisms did not seem to survive for more than 24 hours. In an examination of flies trapped in dysentery hospitals 1,500 were tested by the walking method and 170 by plating the faeces. A typical Shiga was isolated once by the walking method and several magglutinable Flexners from the excreta. The conclusions arrived at are that bacillary dysentery was most rife in the spring and autumn months of the year when the house flies are most numerous—an experience which tallies with what occurred in other theatres of war.

[This report contains much useful information compressed into a reasonably small space. Though it does not bring out any novel or startling piece of information, nevertheless it is useful to have an *ex cathedra* statement upon the whole bacteriology of bacillary dysentery from such a reliable source. Much of the work, as for instance the effect of delayed examination of stools upon bacteriological results, and the carriage of dysentery by flies, traverses old ground. It is certainly useful to have results confirmed, but it would have been more generous to state that partly similar results have been obtained several years ago by previous workers on the same lines.]

SCHORER (Edwin Henry) **Typhoid, Paratyphoid and Dysentery Carriers among Returning Overseas Troops**—*Jl Amer Med Assoc* 1919 Sept 6 Vol 73 No 10 pp 763-766

In February 1919 the chief surgeon of the American Expeditionary Forces stated that during the autumn and early winter of 1918 the incidence of enterica amongst the American troops overseas had shown a noteworthy increase, more than 874 cases having been reported between October 1, 1918 and February 1, 1919.

The question which presented itself to be solved was what percentage of these cases would become chronic carriers and to what extent would returning troops prove a menace to the home population. It was therefore decided to examine stools of a sufficient number of returning troops to settle this point, at the port of disembarkation. In only two individuals out of 1,000 returning overseas troops were any pathogenic intestinal bacilli discovered, both these proved to be carriers of Hiss-Russel-Y dysentery bacilli, on the other hand no enteric organisms were discovered. In other words only 0.2 per cent of all men examined were found to be carriers.

At the same time out of 50,747 men passing through the hospital at the port of embarkation during March, April and May 1919 (the period covered by this bacteriologic study) six had typhoid fever and only two dysentery of the Flexner Y type, giving a percentage of 0.4 per cent.

P H M-B

STROOKEY (George E) **An Epidemic of Water-Borne Dysentery**—*Jl Infect Dis* 1919 Oct Vol 25 No 4 pp 331-334
With 1 fig

On August 28th, 1911 a dysentery epidemic of the Flexner-Y type broke out amongst the inhabitants of Bertrichamp, a town of 2,000 population, in the department of Meurthe-Moselle.

Large numbers of flies were noted in all rooms where the patients were found. Family infections were common, and a series of twenty-seven cases with nine deaths ensued. The case mortality rate was a high one, 33 per cent, possibly due to the poor physical condition of the sufferers. A leak in the joint of one of the pipes of the main water supply, with gross faecal contamination from a latrine near by, appeared to furnish adequate explanation for the fatal outbreak. Only six mild cases amongst American troops quartered in the village were noted during the same period.

P H M-B

JOTTEN (K W) **Weitere Mitteilungen über die Ergebnisse und Beobachtungen bei der bakteriologischen Ruhrdiagnose** [Further Notes of Results and Observations in the Bacteriological Diagnosis of Dysentery]—*Med Klinik* 1919 June 22 Vol 15 No 25 pp 614-616

In association with UNGERMANN the author was able by attention to technique and despatch of specimens, etc., to establish a bacteriological diagnosis in 36 per cent of all clinical dysenteries and by employing special attention in as many as 63 per cent of chronic

cases Various experiments were made with the object of ascertaining the best method of sending dysenteric material through the post Each suitable stool was treated in three different ways at the patient's bedside The first was taken into a glass tube in the ordinary way, the second spread and dried on stout filter paper, while the third was spread thinly in the manner of a sputum film on to a glass slide Naturally it was found that methods of conservation by drying were not a success as regards the isolation of specific dysentery organisms By plating out a large number of Drigalski and Endo plates a higher percentage (50.6 per cent) of positive results was obtained Schmitz's bacillus was identified

P H M-B

SCHEER (Kurt) Ueber die keimtotende Wirkung des Magensaftes auf die Bazillen der Typhus, Koli und der Ruhrgruppe [Sterilization of Typhoid, Coli, and Dysentery Bacilli by the Gastric Juice] —*Arch f Hygiene* 1919 Vol 88 No 3 pp 130-138

Though in most text books of physiology the bactericidal action of the gastric juice is emphasized yet the evidence seems to rest upon more or less inexact data These the author has sought to establish by numerous experiments of which the protocols are given in the text

The organisms employed for this purpose were *B typhosus*, *B paratyphosus* B, *B Flexner-Y*, *B Shiga-Kruse* and *B coli*

The general conclusions arrived at were that the bactericidal action of the normal gastric juice is pretty considerable, it kills off the pathogenic bacteria in two minutes—the essential ingredient would appear not to be the free hydrochloric acid but its salts The pepsin itself plays no part whatever

Typhoid and paratyphoid B bacilli appear to have the same powers of resistance, the Shiga-Kruse perishes sooner, the Flexner-Y bacillus and *B coli* are the sturdiest of the lot

P H M-B

HILGERS (E W) Pseudodysenteriebazillen als Erreger von Cystopyelitis. [Pseudo-Dysentery Bacilli as Cause of Cystopyelitis] —*Cent f Bakt* 1 Abt Orig 1919 Sept Vol 83 No 6 pp 414-420

This paper is a compendium of the results of a bacteriological investigation of 89 bacillurias during a period of six months Forty-two of these owed their origin either to true *Bacillus coli* or its near relations, *faecalis alkaligenes* was present on two occasions Twice pseudo-dysentery bacilli were isolated One patient suffered from chronic prostatitis, the other, a child, from a follicular inflammation of the intestine True dysentery bacilli, Shiga and Flexner types, have seldom been found in the urine It is suggested that they may reach the bladder either from direct infection from the anus, as in the female, by haematogenous infection, or from active formation of pyamic abscesses in the kidneys The pseudo-dysentery bacilli referred to were pathogenic to rabbits These strains fermented saccharose in addition to mannite and maltose and were also agglutinated by a standard serum in a titre of 1:5000

[This paper is a very involved one and is therefore difficult to follow and the author's arguments that these organisms are in reality connected with the true dysentery organisms are open to criticism]

P H M-B

MILOSLAVICH (Eduard) **Ueber postdysenterische Mastdarmerkrankungen** [Post-Dysenteric Affections of the Rectum]—*Med Klink* 1919 June 29 Vol 15 No 26 pp 636-637
With 1 fig

Describes two cases of stricture of rectum simulating malignant disease, following acute dysentery, probably of bacterial origin though it is not specifically stated, and necessitating operative interference

From other published cases it would appear to be possible for malignant disease to develop on a stricture of dysenteric origin

P H M-B

WALLER (W E) **The Use of Anti-Dysentery Serum in the Treatment of Bacillary Dysentery A Series of 341 Consecutive Cases treated in Mesopotamia, with Tabular Account of the Incidence of Complications**—*Lancet* 1919 Nov 1 pp 778-780

This paper should be read in conjunction with the one by KLEIN in the same number of the *Lancet* The account is founded upon 608 cases of dysentery passing through a stationary hospital in the forward area in Mesopotamia Of the number 140 were proved to be amoebic in origin Of the 341 cases of clinical bacillary dysentery 117 were due to the Shiga organism and 91 to the Flexner-Y, of those proved to be due to the former bacillus 16.7 per cent died As a routine practise, as soon as the diagnosis had been made on clinical grounds, 140 cc of serum (Lister Institute) was given in three subcutaneous injections at eight hourly intervals during the first 24 hours, in cases of less severity 100 cc in two subcutaneous injections during the same period According to the tables given in the text one can derive exactly the same conclusions as are reached in the paper by KLEIN, that is, from the 7th day onwards it would appear the serum is less efficacious and the death rate is heavier

Complications—Arthritis occurred in 12 per cent and constituted the most intractable and distressing complication The knee again was the commonest joint affected, but other articulations were implicated—ankles and shoulders, manubrio-sternal joint, wrists, hip, sterno-claviculars and inter-phalangeal, much of the swelling was peri-articular

In 56 per cent of serum-treated cases serum sickness developed, accompanied by a rash varying from an erythema to an urticaria, in 12.4 per cent of cases it was accompanied by a serum arthritis, generally on the tenth day after injection During the course of the serum sickness an increased liability to intercurrent disease, such as relapses from subtertian malaria, and in two cases heat stroke, one fatal, was noted

P H M-B.

KLEIN (Bernard G.) **Notes on Serum Treatment of Bacillary Dysentery and on Dysentery Arthritis**—*Jl Roy Army Med Corps* 1919 Oct Vol 33 No 4 pp 343-352 and *Lancet* 1919 Nov 1 pp 775-778

The material for this paper was obtained in Rouen during the period from September 1917 to November 1918. The cases of indigenous bacillary dysentery numbered 973 in all and from no less than 412 dysentery bacilli were recovered. For convenience sake the cases could be classified into the customary grouping on clinical grounds: *mild*, *typical average*, *severe*, and *grave*, this latter group included all the men on the "dangerously ill," or "seriously ill" lists. As regards *serum treatment*, there was a progressive tendency towards larger doses, the greatest single dose being 120 cc. The following useful tables are given—

TABLE II—51 Cases Treated with Anti-Dysenteric Serum

Day injected	No of cases	Died	Recovery unsatisfactory
1st-4th	9	1	1
1st-5th	13	2	2
6th-9th	24	4	5
10th and over	14	3	6

TABLE III—23 Cases that Received Serum Intravenously

1st-5th	6	2	1
6th-9th	12	2	2
1st-6th	10	2	1
7th-9th	8	2	2
10th and over	5	3	-

The value of antidyenteric serum may be considered from two aspects, (1) its power to save life, (2) its effect on the rate and completeness of recovery. In 134 cases untreated by serum persistent bowel disturbances, presumably due to unhealed lesions, were extremely frequent, "persistent colitis" was noted 28 times as against twice amongst the fifty-one of the former.

The very useful conclusions formulated, as a result of this enquiry, conclusions which coincide closely with the views generally accepted on the proper administration and effects of this serum in bacillary dysentery, are given below—

(1) Antidyenteric serum should be given in large doses—60 to 100 cc.—and preferably intravenously.

(2) It is most efficacious when administered as early as possible in the disease.

(3) From the point of view of treatment the effect of serum may be considered (a) from the first to 5th or 6th days when it acts most favourably, both as regards averting death and hastening recovery (b) During the intermediate stage from the 6th-10th day, a case

once having reached this stage is likely to die, or to recover, irrespective of serum (c) During the third stage—that is, one of dehydration and intoxication, in which serum is of course useless

Dysenteric Arthritis—This complication occurred in eight cases out of the series of 973. The knee-joint was involved in every case, two of these had the ankles or rather the synovial extensor tendons sheaths and temporo maxillary joints involved as well. The time of onset was during convalescence about the 20th day. This joint effusion had no relation to the arthritis of serum sickness. It is clearly not confined to severe cases of the disease. The fluid obtained was straw coloured, slightly turbid and sterile on culture, it possesses considerable power of agglutinating the homogenous dysenteric organisms. Thus apparently the blood serum and joint fluid possess the power of clumping the Shiga or Flexner-Y bacilli, as the case may be, to the same degree

P H M-B

SCHIFF (Elwin) *Die Behandlung der Dysenterie mit Formalineinlaufen* [Treatment of Dysentery with Formalin Enemata]—*Wien Klin Woch* 1919 Oct 9 Vol 32 No 41 pp 1005-1007

This paper deals with the treatment of bacillary dysentery [apparently mostly Shiga infection] by rather a novel method. Enemata of formalin, 1 per cent of a 40 per cent solution of formaldehyde, were run into the lower intestinal canal by means of a stout rubber rectal tube—that is to say 300 cc at a time containing 4 per cent formaldehyde, the patient being disposed on his left side with drawn up knees. The majority of the cases were in women.

In some instances five injections were administered at the rate of two a day, and generally at this period the evacuations became faecal. Children do not tolerate this treatment as well as adults. It has one drawback in that it is painful, generally the pains last only during the course of the injection, and after several days in conjunction with the healing process they become less and less noticeable and may be taken as an indication of proliferation of the epithelium. In normal people injection of this strength causes no inconvenience whatsoever.

The cases, details of 50 of which are given, received no other medical treatment.

P H M-B

KLEINSCHMIDT *Die Behandlung der Ruhr in den städtischen Krankenanstalten in Elberfeld im Sommer 1918* [Treatment of Dysentery in the State Hospital of Elberfeld]—*Med Klinik* 1919 May 4 Vol 15 No 18 pp 435-438

Bacillary dysentery previous to the war occurred in sporadic manner, especially in the Barmen district. It was imported from the front into a great many towns in the summer of 1918. The diagnosis appears to have been made mostly on clinical grounds. Of complications conjunctivitis occurred in three cases, arthritis in 1.25 per cent. General anasarca was observed twice. The more

serious cases were treated with serum up to 180 cc and medicaments, the less severe by medicines alone with satisfactory results. No complications of any note were observed.

P H M-B

SCHNEIDER (Albert) Erfahrungen ueber Ruhrbehandlung und ihre Beurteilung [Treatment of Dysentery and its Evaluation]—*Med Klink* 1919 June 15 Vol 15 No 24 pp 589-590

This paper deals in a general way with war dysentery presumably of bacillary origin. Good results were obtained with charcoal and bolus (Kaolin) in small doses (10-15 gms) but larger doses up to 50 gms are not well tolerated.

P H M-B

KORTHOFF Die Differenzierung der atoxischen Dysenteriebazillen [Differentiation of the Atoxic Strains of the Dysentery Bacillus]—*Cent f Bakt* 1 Abt Orig 1919 Sept 27 Vol 83 No 6 pp 409-414

This paper deals with the classification of abnormal strains of the dysentery bacillus. The biochemical reactions of a number were tested in 1 per cent litmus peptone water with the addition of 1 per cent of different carbohydrates. The reactions were read every 24 hours for four days using Witte's peptone and Merck's sugars. The original cultures were reinoculated weekly and protected from light. Considerable variation in the reactions of so called Strong-Y and Flexner were observed, especially in maltose, even when preserved for four weeks in an ice chest. Attempts at cultivating a particular strain from one individual separated from a colony by microscopical means were only partially successful. Complement-deviation reactions also pointed to considerable differences between the original strains and the variants obtained by culture. The close connection of the atoxic dysentery organisms, in which one includes the mannite fermenting groups, can be verified by biochemical and serological tests. A further differentiation of the dysentery organisms then into toxic and atoxic groups is not justifiable.

P H M-B

DIENES (L) Beobachtungen ueber das serologische Verhalten der giftarmen Dysenteriestämme [Observations on the Serological Behaviour of Atoxic Dysentery Organisms]—*Zeitschr f Immunitätsf u Exper Therap* 1 Teil Orig 1919 Oct 23 Vol 28 No 6 pp 456-473

Absorption tests with immune sera prepared against the atoxic dysentery organisms (Flexner or mannite-fermenting group) show they can be divided into separate types. Specially prepared rabbit sera may be utilized for their identification.

[This paper is very involved and therefore difficult to follow, it deals entirely with serological without the confirmation of other biological reactions. It is a purely bacteriological investigation which is now very familiar, but which appears to have no practical outcome.]

P H M-B

HIRSCH (Paul) Versuche ueber Entgiftung von Ruhr- (Shiga-) Bazillen zwecks Impfstoffgewinnung [Experiments on the Detoxication of the Shiga Bacillus with a view to Obtaining the Vaccine]—*Zeitschr f Hyg u Infektionskr* 1919 Oct 27 Vol 89 No 2 pp 176-210

The toxicity of Shiga vaccine is dependent upon the temperature at which the bacterial suspension is killed off, if sterilised for one hour at 52° C the resulting vaccine is less toxic than one kept at 65° C. The addition of tricresol as a preservative has no effect, or otherwise, upon the toxicity. The age of the cultures used in preparation of the vaccine has no bearing upon the toxicity. The addition of iodine trichloride diminishes the toxicity of the vaccine, and possibly Trypoflavin has the same influence, on the other hand Vuzin and CO₂ have no effect. Active guinea-pig serum, or complement, exercises a considerable detoxicating influence upon living as well as dead Shiga vaccine. The antigen content remains constant despite detoxication.

P H M B

KABESHIMA (Tamezo M) Recherches expérimentales sur la vaccination préventive contre le bacille dysentérique de Shiga—*C R Acad Sci* 1919 Dec 1 Vol 169 No 22 pp 1061-1064

Inoculation against bacillary dysentery is no novelty and has been practised by SHIGA since 1898, but advances have been frustrated by the extreme sensibility of laboratory animals to the toxins of Shiga's bacillus, making their immunization a matter of considerable difficulty, this is especially the case in rabbits.

Recently d'HERELLE discovered in the dejecta of Shiga bacillary dysentery convalescents a bacteriophagic microbe, which when brought into contact with Shiga's bacillus disintegrates it, and he has succeeded in producing a satisfactory immunization of the smaller laboratory animals by means of this product.

The author has confirmed this and prepares his bacteriolysate as follows—A loopful of Shiga culture is emulsified in 10 cc of broth and to this is added 1/1000 cc of d'HERELLE's bacillus and incubated at 37° C, after two hours the Shiga bacillus multiplies rapidly, but at the end of another three or four all these organisms are disintegrated. After a night's incubation the liquid is filtered through a Chamberland filter L2 and a limpid fluid is obtained containing the Shiga toxins, the strength of which is maintained for several days, but rapidly deteriorates.

Rabbits were injected intravenously with the filtrate, 1 cc, of varying ages. On the eleventh day the animals are reinoculated with a 24 hour culture of Shiga's bacillus so virulent as to produce death in uninoculated rabbits in one third of this dose. All ten rabbits thus treated survived, while all the animals succumbed. Apparently an active immunity is developed fifteen days after the primary inoculation. Inoculation by the subcutaneous route proved equally as efficacious as by the intravenous.

Those inoculated with 2 cc of filtrates from three weeks to three months of age and subsequently given an otherwise fatal intravenous

injection of Shiga culture survived, while still more mature filtrates conveyed only a relatively small amount of protection to rabbits

Should this preparation (or lysate) not cause too great a reaction it may profitably be used as a prophylactic in man

P H M-B

SCHEER (Kurt) & OBÉ Zur Frage der Wirksamkeit des Ruhrschutzimpfstoffes "Dysbakta" (Bohncke) [On the Efficacy of the Dysentery Vaccine Dysbakta (Boehncke)]—*Zeitschrift für Immunitätsforschung und Experimentelle Therapie* I Teil Orig 1919 Oct 23 Vol 28 No 6 pp 400-409 With 6 curves & 7 text-figs

The main point of this communication, which is based upon statistics obtained during the war, is to show that inoculation of masses of men with BOHNCKE'S "Dysbakta" confers no immunity against the incidence of the disease, nor does it in any way modify its course

P H M-B

SACHS (Ferdinand) Ueber toxische Ruhr im Kindersalter [Toxic Dysentery in Childhood]—*Muench Med Woch* 1919 Sept 5 Vol 66 No 36 pp 1031-1033

Describes two cases of acute bacillary dysentery in children in Germany with one death The paper contains no new information

P H M-B

MIXED AND UNCLASSIFIED DYSENTERY

O'CONNOR (F W) Intestinal Protozoa found during Acute Intestinal Conditions amongst Members of the Egyptian Expeditionary Force, 1916-1917—*Parasitology* 1919 Oct Vol 11 No 3 & 4 pp 239-255 With 1 plate and 3 text-figs

This paper, representing the work of an experienced protozoologist who has taken advantage of the unrivalled opportunities presented in a field laboratory attached to the Egyptian Expeditionary Force during its historic progress through the Sinai desert, deserves the closest attention The work covers a year from August 1916 The material derived from European and Indian troops, as well as from members of the Egyptian Labour Corps, was submitted to the laboratory for protozoological examination, and for cultivation for cholera vibrios Many of the drawbacks familiar to field laboratory workers during the war are related and the manner in which they were overcome The specimens were often stale, owing to delay in transit to the laboratory, urine had been passed in quantities into the pan, too liberal use of antiseptics had been made in cleansing the receptacle, or the admixture of sand, almost unavoidable in the desert, rendered their minute examination a matter of great difficulty

The pathological stools were divided into two classes—The blood and mucus and the liquid diarrhoea ones, of the former the great majority were bacillary in origin In acute bacillary cases the dejecta consisted of almost pure blood, or of slightly tenacious mucus tinged with blood, later in the disease they merged into diarrhoea classed

under the latter category. In amoebic dysentery the classical type, that is, faecal in character with streaks of bloodstained mucus predominated but in a few cases many pathogenic amoebae were present when the macroscopic appearance suggested the bacillary disease. In one exceptional case the evacuations were suspicious of cholera, but subsequently blood and mucus stools with large numbers of entamoebae rendered that diagnosis untenable. In *bilharzia* dysentery the stool generally consisted of pure blood, though the character might vary considerably.

Liquid Stools — In *Lambia* infections, when the parasite is in the vegetative condition, a yellow-ochreous diarrhoea with streaks or pin points of mucus is fairly constant. A brownish grey liquid stool may be passed during the later stages of bacillary dysentery and is almost invariably associated with a vegetable organism.

Dealing with more minute observations upon amoebic dysentery, a fuller account is given of the choleraic fulminating type of this disease already referred to. The pathogenic amoebae were discovered post mortem in this case in large numbers in the bases of the ulcers and were active with prominent sharp pseudopodia, and a few contained ingested red cells. The very extensive destruction of the large intestine which was found post mortem in this case seems hardly compatible with the patient's ability to keep up with the advancing troops on that very strenuous march till he finally collapsed. One has, however, to bear in mind that this is possible [The reviewer has encountered two similar instances]. A second acute onset was found to be one of a double B Shiga and amoebic infection.

Entamoeba histolytica was present, in either free or cystic form, in 75 per cent of European troops, but only in 50 (or 27 per cent) did it exist in the free vegetative state. The so called tetragena nucleus is ascribed to degenerative changes in the dying organism [see also DOBELL "The Amoebae living in Man"]

Throughout all the examinations only one case of simultaneous double acute amoebic and bacillary disease was proved. These must therefore be rare. [This is also the experience of the reviewer under similar conditions in the same theatre of war.] *Minuta* and even large vegetative forms of *E. histolytica* with two nuclei were met with. Encysted histolyticas were present in bacillary stools, but did not appear to influence the course of the disease.

A novel point is the variety and number of inclusion bodies found in *Entamoeba coli*, these include — *Entamoeba histolytica* and *Lambia* cysts, free *Lambia*, Chilomastic cysts and oocysts of *Isospora hominis*. Chromatoid bodies, contrary to the generally accepted descriptions, were demonstrated within *E. coli* cysts. *Tetratrichomonas* was the Trichomonad most frequently seen, occasionally with ingested red blood corpuscles, only one cell in any particular parasite. Species of *Trichomonas* were common in the gerbilles, jerboas and small mice of the desert.

Regarding the pathogenicity of *Lambia* the author is very guarded in his opinion, in all excepting three cases the patients evidenced little or no inconvenience from the presence of this parasite.

The oocysts of *Isospora hominis* were found nine times, seven in white troops, once in Indians and once in an Egyptian. Development

of the spore into sporocysts and sporozoites took place 24-48 hours after passage of stool. Two very heavy infections were observed, one in a new recruit with marked digestive disturbances which persisted for more than a month while under observation, as did also the number of cysts. Attempts at infection of puppies with this parasite failed. Vegetable cells associated with diarrhoea were of various kinds, the most remarkable was a greenish body, varying from a few microns in size to one which almost occupied the microscopic field, the cell, which is figured, was covered with hair-like projections.

Eleven excellent figures, mostly illustrating *Entamoeba coli* ingesting other intestinal protozoa, and a series of protocols giving the large series of statistics upon which the account is based complete the paper. One should note that 7.25 per cent of the Egyptian Labour Corps harboured *E. histolytica*, an almost identical percentage being found in the 2,000 odd European troops examined.

P H M B

KOFOID (Charles A.), KORNHAUSER (Sidney I.) & PLATE (J. T.)
Intestinal Parasites in Overseas and Home Service Troops of the U S Army with Especial Reference to Carriers of Amebiasis.—
Jl Amer Med Assoc 1919 June 14 Vol 72 No 24
 pp 1721-1724

An examination of 1,200 men of the U S Army as well as 300 men of Home Service troops afforded the material for this research, and made it possible to estimate the relative degrees of infection in these two groups. The former group were considered representative of the overseas troops and were all sick or wounded soldiers evacuated from France. The rapid detection of protozoal cysts was aided by Donaldson's iodine-eosin stain. On the whole it was found that the overseas troops were more heavily parasitized than were the home service men in the proportion of 1.32 infections by different parasites (naturally not all pathogenic) per man, as compared to 1.23 per man. Of these 10.8 per cent in the former group were carriers of "*Endamoeba dysenteriae*" and 3 per cent of the latter.

The authors recognize six distinct races of *E. dysenteriae* as determined by DOBELL.

[It will be much more convenient and less confusing for all were protozoological workers to decide on calling the pathogenic amoeba *Entamoeba histolytica*.]

P H M-B

BLACKBURN (C. Bickerton). **Some Experience with Dysentery in the Palestine Campaign**—*Med Jl Australia* 1919 Aug 23 Vol 2 No 8 pp 148-150

This paper is a well expressed summary of dysentery as it appeared amongst Australian troops in 1918 by the late Bickerton Blackburn, consulting physician to the Forces, whose sudden death is so much regretted.

Owing to the great distance of the base hospital a large number of the cases were convalescent on admission. Success in treatment was greatly dependent on early diagnosis and it was found possible to differentiate with some certainty between the two main varieties

from naked eye inspection of the stools in conjunction of course, with the clinical history. In amoebic cases the small evacuations showed blood and mucus intimately mingled with the faeces. Toxæmic symptoms were always more marked in bacillary cases, the amoebic cases, on the other hand, were never so ill. In cases of double infection it is necessary to remember that the incubation period of the protozoal disease is a long one, so that in bacillary cases which do not clear up it is always necessary to suspect a coexisting amoebic infection. The necessity of early microscopic examination of freshly passed stools is emphasized.

Blood examination showed a moderate leucocytosis in acute bacillary infections. Amoebic infections showed a somewhat higher count, 10-20,000, but those above 15,000 are suspicious of hepatitis or abscess. An account is given of some exceptional cases and well illustrates the pitfalls that even the most experienced will encounter when dealing with chronic intrahepatic abscesses of amoebic origin. The absence of entamoebic cysts from the stools or signs of intestinal ulceration must not be taken as negating such a diagnosis, rather one should pin one's faith on the temperature chart and the leucocytosis.

P H M-B

ESCOMEL (E) *La Tricomonosis Intestinal*—78 pp With 8 figs
1919 Lima Sanmarti & Co.

An important monograph opening with a brief historical survey and proceeding to a detailed account of the *Trichomonas*, its geographical distribution, biological and cultural characters and pathogenic activities. The author sums up in a series of conclusions as follows:

- 1 Intestinal trichomoniasis has as much right to a place in human pathology as amoebiasis, lambliasis, tetramytosis, balantidiasis or other similar protozoal diseases.

- 2 It has a wide sphere of action throughout the world and this makes a knowledge of it correspondingly useful.

- 3 Its causative agent is the *Trichomonas intestinalis*, cultures of which, when inoculated, have reproduced the disease.

- 4 The parasite develops cysts which enable it to resist the action of destructive agents.

- 5 It reproduces itself by direct or indirect division or by conjugation.

- 6 Human infection occurs by direct contagion by means of flies or other insects or by drinking water or by water contamination of fruit or vegetables.

- 7 Intestinal trichomoniasis takes the following forms.

- (a) Dysentery syndrome (b) Dysentery passing into simple diarrhoea without blood (c) Diarrhoea alone (d) Diarrhoea becoming dysenteric (e) Choleraic diarrhoea.

- 8 The *Trichomonas*, like the amoeba, causes hepatitis.

- 9, Its pathological anatomy is distinguished by inflammation and ulceration from the rectum upwards, decreasing as it ascends.

- 10 It is imperative to make a definite diagnosis, which can be done by a few moments' microscopical examination of fresh faeces.

11 Prognosis was often serious until we introduced the treatment by turpentine and iodine, which most modern observers agree in regarding as specific

12 Vaginal and buccal react to the same treatment as intestinal trichomoniasis. We have seen sterility cured by curing a Trichomonal infection of the vagina

13 If amoebae or tetramitus etc are present treatment for them must also be instituted, hence the necessity for a well established microscopic diagnosis

F S A

TIXIER (Léon) *La Dysenterie à Balantidium Coli en France* (A propos d'un Cas Autochtone) — *Gaz des Hôpt* Paris 1919 Nov 18-20 Vol 92 No 71 pp 1117-1120

A record of an indigenous case occurring in the Department of the Seine in a farmer associated with pigs. The patient was seized with dysenteric symptoms and was successfully treated with emetine

P H M-B

DOLD (Hermann) *Weitere Mitteilungen ueber Pyocyaneusenteritis.* [Further Notes on Pyocyanus-Enteritis] — *Arch f Schiff's-u Trop-Hyg* 1919 Oct Vol 23 No 19 pp 472-473

The author has discovered a disease simulating enterica in Shanghai due to a *pyocyaneus* infection. In his earlier papers on this subject [see this *Bulletin*, Vol 13, p 347] he described the isolation of this organism which is considered identical with *B fluorescens liquefaciens*

The sera of eleven additional cases agglutinated the bacillus in a dilution of 1:200. One case had dysenteric symptoms. [The wide distribution of *B pyocyaneus* in the tropics and especially its common occurrence in faeces after excessive decomposition makes one hesitate before assigning any specific rôle]

P H M-B

HELMINTHIASIS

O'CONNOR (P W) **Helminthic Ova in Human Stools Expeditionary Force Sinai Peninsula, 1916-1917** — *Jl Trop Med & Hyg* 1919 Sept 1 Vol 22 No 17 pp 166-167

The work described in this paper was carried out at Kantara, Romani and Mazari Three fairly thin coverslip films of faeces were made with saline from a specimen of each case on every occasion on which the patient's stool was examined The results were tabulated thus —

	White troops	Indian native troops	Egyptian natives, patients	Egyptian natives, healthy
Cases examined	2,082	99	667	1,006
Cases infected	14	14	403	812
<i>Ankylostomum</i> ova	1	9	370	690
<i>Ascaris lumbricoides</i> ova	0	5	115	275
<i>Tricocephalus trichvuris</i> ova	9	1	8	18
<i>Oxyuris vermicularis</i> ova and adults	0	1	8	17
<i>Strongyloides stercoralis</i> (embryos)	0	0	9	13
<i>Taenia saginata</i> ova	1	0	6	18
<i>Hymenolepis nana</i> ova	1	1	4	22
<i>Heterophyes heterophyes</i> ova	2	0	12	21
<i>Schistosoma mansoni</i> ova	0	0	58	22
<i>S haematobium</i> ova	0	0	32	22

The two cases of *Heterophyes* infection in White Troops had only been in Egypt for a short time and had never served abroad before arriving in that country One complained of "abdominal discomfort, nausea some time after food and tenderness below the right costal margin" These symptoms disappeared after expulsion of a number of the flukes by filix mas In the cases among Egyptian Native Labourers infections of the bowel with *S haematobium* were much more frequently accompanied by passage of pure blood or clot than in *S mansoni* cases It was noted that the number of schistosome ova passed seemed to bear no relation to the morbid appearances of the stools or the clinical manifestations of the disease Clinically the most severe dysenteric cases due to *Schistosoma* were associated with the species *S haematobium*

R T Leiper

ACTON (Hugh W) **The Incidence and Importance of Intestinal Entozoa amongst Indian Members of the Mesopotamian Expeditionary Force** — *Indian Jl Med Res* 1919 Apr Vol 6 No 4 pp 601-613 With 3 plates

The results of over two years routine examination of faeces amongst the Indian members of the Mesopotamian Expeditionary Force are embodied in the present paper The concentration methods of LANE or BASS were found most effective Three consecutive examinations of any given case are practically sufficient to negative a helminth

infection. Ankylostomes were the commonest helminth and the parasite was more frequent in followers than in combatant Indians (44 per cent as against 12 per cent). Of the fighting troops the Gurkhas were most heavily infected (33 per cent), those from the Punjab giving only 8.5 per cent positive.

The longer the service of the infected troops in Mesopotamia the greater was the tendency for a natural cure owing to the good hygienic conditions. Out of 2,981 cases examined Ankylostomes occurred in 724 (24 per cent), *Ascaris lumbricoides* in 272 (9 per cent), *Trichocephalus trichurus* in 134 (4.8 per cent), *Strongylodes stercoralis* in 32 (1 per cent), *Taenia saginata* in 40 (1.3 per cent), *Hymenolepis nana* in 30 (1 per cent), *Hymenolepis diminuta* in 8 (1 e 0.2 per cent), *Oxyuris vermicularis* in 17 (1 e, 5 per cent). There were two cases of infection with *Clonorchis sinensis*, one case of *Heterophyes heterophyes* and one of *Schistosoma mansoni*.

During 1918 the stools of about 200 Turkish prisoners of War were examined. Ankylostomes occurred in less than 5 per cent. Fifty local Arab labourers were also examined and only a few found to be infected. It is stated that medical officers with European experience rarely recognised ankylostome infection and did not recognise its economic importance in Labour Corps.

R T L

YASAKI (Yoshiwo), TERADA (Masanaka) & FUJII (Tamotsu) **Intestinal Parasites of College Students**—*Sei-I-Kwai Med JI* 1919 June 10 Vol 38 No 6 pp 23-29

The stools of 458 College Students were examined 77 per cent were found to contain the ova of intestinal parasites

	Per cent		Per cent
<i>Trichocephalus trichurus</i>	54	<i>Trichostrongylus orientalis</i>	7
<i>Ascaris lumbricoides</i>	38	<i>Clonorchis sinensis</i>	6
<i>Ancylostoma duodenale</i>	22	<i>Metagonimus yokogawai</i>	6

The percentage of upper class students suffering from *A. duodenale* was small. Sometimes as many as 4 different kinds of parasites were found in one case.

R T L

OHNS (R) [Hookworm, Ascaris and Trichuris Infection among the Inmates of Taikoku Prison]—*Taiwan Igakukai Zasshi* [*Jl of the Formosa Med Soc*], 1918 Jan 25 No 182 pp 109-112
[From Review by R G MILLS]

Of 300 political prisoners in the Taikoku prison, taken during the rebellion of 1913 from the mountain villages of Ohio and Dainan, more than half had scabies, eczema and oedema of the face and legs. All of them were undernourished. A large number of these prisoners had died with severe anaemia, oedema of the face and legs, and stomatitis with loosening of the teeth. At autopsy nothing was found to account for these symptoms except hookworm infection. On account of this finding the author made stool examinations of all these political prisoners, and 90.3 per cent of them were found to be infected with hookworm. The stools of the other prisoners numbering about 1,000 were then investigated. Of these 97 were Japanese,

and the rest Formosans. A small piece of stool was emulsified thoroughly in 100 cc of water and filtered through a piece of gauze. After the sediment had settled it was spread on a slide and examined microscopically for ova.

Of those examined 59 per cent of the Formosans and 36.1 per cent of the Japanese were found to harbour hookworms. *Ascaris* ova were found in 66.4 per cent of the Formosans and 45.4 per cent of the Japanese. The percentage of *ascaris* infection was relatively higher in women and children than in men. *Trichuris* ova were found in 66.1 per cent of the Formosans and 67 per cent of Japanese, with a relatively higher percentage in women and children.

In all, 92.6 per cent of the Formosan prisoners and 88.6 per cent of the Japanese were infected with at least one of these parasites, and 30.9 per cent of the Formosans and 12 per cent of the Japanese with all three. These figures show the great prevalence of hookworm, *ascaris* and *trichuris* infection among both Formosan and Japanese prisoners.

R T L

NAGAHAMA (T) & OGUCHI (C) [Intestinal Parasites in the Chinese and Japanese of Manchuria] (From the *Jl S Manchurian Med Assoc* Vol 5 No 3)—*Chuo Igakkai Zasshi* [*Jl Central Med Assoc*] 1918 Mar 5 No 273 p 1167

[From Review by R G MILLS]

The incidence of intestinal infection of the Japanese and Chinese in Manchuria is shown in the following table

	Japanese			Chinese		
	Total	No Positive	Per cent	Total	No Positive	Per cent.
<i>Ascaris</i>	307	74	24.1	198	91	46.0
<i>Trichuris</i>	307	74	24.1	—	None	—
Hookworm	307	34	11.1	193	7	3.5
Yokogawa's fluke	307	6	2.0	—	None	—
Miscellaneous	307	2	0.7	—	—	—

R T L

NAKAGAWA (Koan) Further Notes on the Study of the Human Lung Distome, *Paragonimus Westermanni*—*Jl Parasit* 1919 Sept Vol 6 No 1 pp 39-43 With 2 text-figs

In 1915 the author found 17 different species of cercaria infesting the molluscs in the rivers of Shinckiku, Formosa. One of these he believed to be that of the human lung distome but numerous experiments failed to prove this. Later at Kalapai in Oct 1917 a new cercaria was found which seemed still more closely related to the lung distome, and, as the previously recorded cercaria occurred abundantly in rivers running through villages free from infection, the author is now doubtful as to its identity with the human lung fluke [as had been reported in the *Jl of Experim Med* Vol 26, No 3*].

The young encysted larvae in the crab, hitherto supposed to be those of the lung distome [*loc cit*], has since been identified as that of an

* See this *Bulletin* Vol 2, p 74.

undescribed fluke, *Stephanolecithus parvus* The author now thinks that he has succeeded in tracing the young encysted form of the lung fluke and that it is one which is "chiefly found wedged in the muscular tissues or in the epidermis of the crab" [New illustrations are given of the redia, free cercaria and the encysted cercaria at various stages of growth]

R T L

YOKAGAWA (T) [*Biological Study of Paragonimus Westermanni*]—*Tokyo Iji Shunji* (*Tokyo Medical News*) 1918 Feb 9 No 2061 pp 311-354

[From Review by R G MILLS]

The encysted cercaria of the distome of the lung is not set free in artificial gastric juice, which exerts an injurious action of variable degree on the encysted cercaria This is due to the free hydrochloric acid present and was found to be counteracted more or less by the presence of pepsin It was more marked at higher than at low temperatures, cysts obtained from decomposed crabs were more readily affected than those from live ones Cysts soaked in water for a considerable time are also more susceptible The cercariae may be set free and remain alive for a time in solutions containing less than 0.03 per cent HCl or 0.1 per cent acetic acid, or lactic acid

Encysted cercariae are released by dilute solutions (0.5 to 1.0 per cent) of sodium and potassium bicarbonate In solutions of 1 per cent or more (or over 0.1 to 0.5 per cent NaOK or KOH) they are killed Pancreatin lessened this injurious action which was more marked for cysts removed from decomposed crabs, or which had been left for some time in water, than for those obtained from live crabs, the cercariae dying promptly even in dilute alkaline solutions

Encysted cercariae from decomposed crabs may be released on standing in distilled water, or in 0.3-0.5 salt solution, and may remain alive for a time in the latter

Encysted cercariae from live crabs are most readily released by artificial intestinal juice, best in a solution containing 0.5 to 1.0 per cent pancreatin and 0.1 per cent sodium carbonate Those from decomposed crabs are less easily released The addition of a little bile to the pancreatin solution facilitates its action Bile alone has only slight activity They are less readily released if a considerable amount of albumen is also present

In the living animal the encysted forms are never released in the stomach, but only after reaching the intestine Some are evacuated unchanged in the faeces

R T L

KIKUIKO (M) & IMAMURA (H) [*Paragonimus westermanni* Infection, Treatment by Emetine Hydrochloride]—*Chu Gar Iji Shunpo*. (*Home and Foreign Med News*) 1918 Jan 20 No 908 pp 75-86

[From Review by R G MILLS]

The authors report favourable results in the treatment of pulmonary distomiasis by the subcutaneous or intravenous injection of emetine—

hydrochloride The injections should be given daily and continued for 5 or 6 days after the disappearance of the ova and the blood in the sputum Patients with long standing disease are more prone to develop untoward symptoms due to the drug than are the early cases These symptoms can be relieved by discontinuing the injections

R T L

NAKAGAWA (K) [*Distoma* sp found in the Pin Crab, *Telphusa berardii* Aud]—*Juzenkan Zasshi* (Jl of the Perfection Med Soc) 1917 Dec 1 Vol 22 No 12 pp 1-6

[From Review by R G MILLS]

For convenience this *Distoma* sp is called "Kalapai" from the name of the locality in Formosa where it occurred It is found encapsulated in the crab and has certain points that distinguish it from the corresponding stage of the *Paragonimus* The cysts measure 0.18-0.9 mm in diameter and the cercaria is straight, not bent The excretory bladder is large and dark in colour while the oral and ventral suckers are of good size A refractile spine surmounts the oral sucker, the pharynx is well developed and the oesophagus is somewhat larger The body is covered with fine cuticular spines

The capsule is thick and consists of 2 layers These encysted forms occur in the muscles, liver, gills and legs Both young and old forms occur The former are smaller, 0.11-0.13 mm in diameter and are distinguished from the *Paragonimus* by the straight form, double walls and presence of sharp spines about the oral sucker

The older forms are larger, 0.22-0.24 mm in diameter, and the body of the worm is definitely yellowish The Y shaped excretory system is the only distinctly recognizable structure When removed from the capsule the worm measures 0.35-0.22 mm The suckers are about equal in size and the ventral sucker is placed relatively forward

[Attempts to cultivate young adults from these cercariae have apparently been made by YOKOGAWA, who distinguished a smaller cyst form from the true *Paragonimus*, and infected rats The results were moderately successful but no adults were found The name "Futaguchi mushi" was applied to this form It is not quite clear whether or not these two accounts refer to the same form]

Feeding experiments were made by the author on several animals which might possibly be suitable as final hosts A wild pig was tried without success Three kittens 2 months old were fed the cercariae and the two that died about 20 days later had a few small worms in the bile passages Three more kittens were fed the cysts and two killed on the 5th and 8th day were free from parasites, but the other allowed to live till the 18th was found to have a parasite in the liver and one in the kidney In order to be sure that the parasites found were really the result of the feeding experiments 2 kittens were kept confined from birth in special feeding pens and every precaution taken against accidental infection At the age of 12 days they were fed isolated cysts from the crab's muscle One of these after 20 days incubation was found to have eggs of some sort in the bile and two flukes which were supposed to have given rise to them Chickens, marmots, and a native animal called "bar" which has a "body like a cat and a face like a mouse" were tried without success. *Mica*

used by Yokogawa were satisfactory so far as the young stages were concerned but the flukes did not grow to maturity

The partly matured forms found in the cats were 2 mm in length, and 1.3 mm in width. They were white, delicate, and of the typical fluke shape. The oral sucker had a diameter of 0.14 mm, the pharynx was large and well developed and the oesophagus rather long. The alimentary canal was simply divided in front of the ventral sucker and passing backwards ended blindly. The ovary was almost round and was located to the left of the ventral sucker and the uterus was very much convoluted, occupied the middle of the body and contained many yellowish eggs. The genital pore is round in form and located directly beneath and to the right of the oral sucker. The testes were on both sides of the middle of the body. The vitellaria were well developed and situated on both sides of the body well back and the excretory system was Y shaped with short bladder and long slender ducts. The surface of the body was covered with fine cuticular spines. The specimens obtained from the mouse answered to the same description.

R T L

NAKAGAWA (K) [A New Species of Fluke, infesting the Pond Crabs (*Potamon De Haanii*) of Kalapai as an Intermediate Host]—*Juzenkar Zasshi (Jl of the Perfection Med Soc)*, 1918 Mar 1 Vol 23 No 3 pp 1-2

[From Review by R G MILLS]

In 1917 the author found small cysts in crabs from Kalapai. These crabs were fed to an 8 day old puppy, which was killed 22 days later. At autopsy 28 adult flukes were found in the gall bladder and 26 in the liver. Later this experiment was repeated with white mice. They became infected early, the adult flukes appeared on the 21st day after feeding, and ova appeared in the stools in 24 or 25 days. As these crabs are eaten raw by the natives of Kalapai the author examined the stools of 70 of the natives for ova resembling those excreted by the mice, but none were found.

R T L

NAKAGAWA (K) [A New Species of Flukes found in Crabs]—*Taiwan Igakukai Zasshi (Jl of Formosa Med Soc)*, 1918 Jan 25 No 182 pp 105-106

[From Review by R G MILLS]

The author, in association with Dr YOKOGAWA, investigated the crabs of the mountains of Formosa in connection with their researches on *Paragonimus westermani*. In these crabs they found small cysts chiefly in the liver. At first they thought that these cysts might be those of *Paragonimus westermani*, but later these same cysts were found in crabs from the Ako district where pulmonary distomiasis is unknown.

The author fed these crabs to four young cats and obtained a few adult flukes in one instance. This fact the author has referred to in the *Tokyo Iji Shimpi*, No 2035, August 1917. Recently he repeated these experiments with kittens fed only on their mother's milk, in order to eliminate the possibility that the flukes found had come from other food. In these he found that at first the flukes are small

and are situated deep in the substance of the liver. This is probably the explanation for the failure to demonstrate these parasites in 3 out of the 4 cats used at first. He also fed a dog with these infected crabs and obtained large numbers of adult flukes in the liver and gall bladder.

These adult flukes were oval in shape with the anterior end sharper than the posterior end. They measured about 2 mm in length and 1.3 mm in width. They were easily destroyed by slight pressure. The oval sucker was on the ventral side and measured about 1.4 mm in diameter. The pharynx was well developed and the oesophagus slightly longer than the pharynx. The intestine was long and straight, and divided at the ventral suck into 2 branches which traversed each side of the body and ended blindly at the posterior end. The ventral sucker was slightly larger (0.16 mm in diameter) than the oval sucker, and was located well anteriorly. The ovary was elliptical in shape, and placed slightly to the left and posterior to the ventral sucker. The uterus was long and convoluted. The genital pore was situated on the ventral surface posterior and to the right of the oval sucker. Near this was the seminal vesicle. The testes were large, oval in shape and located in the middle and slightly posterior to the centre of the fluke. The vitellinae were well developed. The vitelline ducts ran along the dorsal part of the body on either side and ended in a large ootype. The excretory pore was at the extreme posterior end. Over the entire surface of the body were long, slender dermal spines. The eggs were brownish yellow in color, elliptical, and slightly pointed at the ends. They measured 0.045 mm in length by 0.02 mm in width.

The author considers this a new species of fluke, and suggests for it the name "*Kalapar distoma*" from the locality where it is found.

R. T. L.

FAIRLEY (N. Hamilton). A Preliminary Report on an Investigation of the Immunity Reactions in Egyptian Bilharziasis.—*Jl. Roy Army Med Corps* 1919 Apr Vol 32 No 4 pp 243-267

The parasitic metazoa apparently resemble protozoal and bacterial invaders by exerting a deleterious influence on their definitive host by means of some soluble toxin. A cellular-humeral response on the part of the host is common to all three groups of parasites. In bilharziasis there is an eosinophile leucocytosis and a corresponding increase in the eosinophile myelocytes in the bone marrow. The humeral response produces an immune body to neutralize the bilharzia toxins. By the technique described by the author a positive complement fixation has been obtained in a high percentage of cases—in 88.8 per cent of cases of less than two years duration and in 74.2 per cent of more chronic cases. As a general rule the higher the eosinophilia the stronger the reaction and the greater the percentage of positive results.

The method has a twofold practical application: (a) in the early diagnosis of the disease before localizing symptoms have developed or where ova are scantily distributed in the dejecta. It would prove of value in determining an "endemic index." (b) In estimating the effect of drug treatment. A valuable series of observations on the blood-picture in experimental bilharziasis in monkeys is given in this most important contribution.

R. T. L.

ELGOOD (B Sheldon) & CHERRY (Thomas) **Bilharziasis Its Incidence and Eradication**—*Lancet* 1919 Oct 11 pp 636-637

186 children were examined consecutively for bilharzial infection at a native dispensary in one of the poorest quarters of the city of Cairo. Of 62 under four years of age two were infected with urinary bilharzia. 62 ranged from 4 to 7 years of age, of these 2 also were infected, whereas in 62 children between 7 and 12 years of age 12 proved to be infected. No attempt was made to determine the degree of intestinal infection. Of 30 mothers none was found infected.

On these statistics the authors dismiss the hypothesis that the unfiltered Nile water supplied to the gardens of Cairo is the chief source of infection. Specimens of *Bullinus* and *Planorbis* were found in small numbers in public ponds and fountains in Cairo itself and in fountains in private gardens. Suitable intermediaries are therefore present to explain local infections, but these are not sufficient of themselves. The Coptic Easter "Sham-el-Nessim" is kept by Moslem and Christian alike. Families spend the day in the country and the children are exposed to infection by paddling and bathing in the ubiquitous channels. This regular annual exposure to the attacks of the cercaria is regarded as the most important factor in the causation of the disease in the city population. It is suggested that if flocks of ducks were kept by the villages the irritation channels would be kept free from snails and the spread of bilharziasis controlled. [This idea has already been put forward by Dr KEATINGE, C M G.]

R T L

DA MATTA (Alfredo) **Schistosomose intestinal** [Intestinal Schistosomiasis]—*Amazonas Medico*, Manaus 1918 Vol 1 No 2 pp 9-11

The case described was treated in the Misericordia Hospital and is the first recorded in Amazonas. The patient is 26 years of age, a native of Pernambuco and has been resident in Manaus for the past 12 years. Examination of the faeces showed lateral-spined *Bilharzia* ova, *Ascaris lumbricoides* and *Trichocephalus trichiurus* ova. The blood count gave 50 per cent haemoglobin. The patient complained of internal pains specially severe in the region of the liver. He was pallid and irritable, with yellow conjunctivae and a furred tongue. There was no appetite and constipation alternated with diarrhoea of several days duration. The liver was congested and tender to pressure. No other visceral symptoms were noteworthy. The treatment given was simply to relieve local symptoms.

F S Arnold

TAYLOR (Frank E) **Intravenous Injections of Antimonium Tartaratum (Tartar Emetic) in Bilharziasis**—*Lancet* 1919 Aug 9 pp 246-248, and *Jl Roy Army Med Corps* 1919 Aug Vol 33 No 2 pp 181-189

The high toxicity of tartar emetic has always been a matter of serious concern to those employing the drug for intravenous injections; nevertheless Taylor finds that CHRISTOPHERSON'S claims that it is a specific remedy for bilharziasis are well founded. The immediate results in ten cases studied were very striking. There were "rapid

disappearance of the blood and ova from the urine, mitigation or disappearance of the hypogastric and perineal pains and pain in micturition, improvement in anaemia, gain in weight and a quite striking improvement in general appearance and feeling of well being" The author considers that colloid antimony sulphide intravenously would be well worth trying in bilharziasis as ROGERS found it effective in small doses in kala azar

R T L

CHRISTOPHERSON (J B) **Intravenous Injections of Antimony Tartrate in Bilharziasis** [Correspondence]—*Lancet* 1919 Aug 16 p 299

Draws attention to the fact that Dr TAYLOR's cases are all soldiers who contracted their infections in Egypt and if they had remained uncured would have been in receipt of pensions

R T L

LOW (George C) & NEWHAM (H B G) **A Series of Cases of Bilharziasis treated by Intravenous Injections of Antimonium Tartaratum**—*Lancet* 1919 Oct 11 pp 633-636

Detailed records are given of five cases of bilharziasis treated by intravenous injections of tartar emetic. The beneficial results were very marked in all. A total of 20 to 30 grains would seem to be sufficient to effect a cure. In other diseases the aggregate dose which has been given by the authors is much larger. The drug should not be given more often than twice a week, at first in $\frac{1}{2}$ gr doses increasing upwards, according to the tolerance of the patient, to $2\frac{1}{2}$ grs which may be regarded as the safe maximum. It is important to dilute the drug well, say in 60 cc of normal sterile saline

R T L

CHRISTOPHERSON (J B) **The Cure of Bilharzia Disease by Intravenous Injections of Antimony Tartrate. The Prophylactic Use of the Drug**—*Brit Med J* 1919 Oct 18 p 484

In this paper the author draws attention to the favourable reports recently published by various observers confirming the view that antimony cures bilharzia. Tartar emetic appears to permeate the eggshell and kill the miracidium. The patient is not only cured but ceases to be a source of danger to others. The treatment of the infected persons may therefore become an important means of preventing the spread of the parasite in endemic countries

R T L

I CAWSTON (F G) **Bilharziasis in Natal** [Memoranda]—*Brit Med J* 1919 Sept 20 p 380

II — **A Case of Bilharziasis in Natal treated by Tartar Emetic**—*Lancet* 1919 Nov 15 pp 873-874

III — **A Specific for Schistosomiasis**—*S African Med Rec.* 1919 Oct 25. Vol 17 No 20 pp 315-316

IV — **Case of Bilharzia Disease complicated by Stone, cured by Tartar Emetic Treatment.**—*Jl Trop Med & Hyg* 1919 Sept 15 Vol 22 No 18 pp 174-175

1 Recently fatal cases of bilharziasis have occurred in South Africa from the accumulation of numerous spinepointed ova of Bilharzia.

in the lungs and brain. It is not uncommon to hear of bilharziasis disappearing during an attack of enteric or after influenza. The tartar emetic treatment has now been adopted by the author to the exclusion of other methods. So far he has not encountered any general symptoms from intravenous injections up to 2 grains of tartar emetic. Intramuscular injections of Colloidal antimony, 1 cc and 2 cc, cause little local reaction but a certain amount of general malaise follows for forty eight hours and the patient should rest in bed.

ii A case is recorded in which a relatively small amount of antimony given at short intervals seemed to be sufficient to effect a cure. Antimony tartrate gr $\frac{1}{2}$ in 15 minims of distilled water was injected intravenously. The dose was gradually increased to 2 grs and then reverted to 1 gr every few days. In all 12 grs were given together with 3 cc of colloidal antimony. After six weeks' treatment the patient had gained 4 lb in weight. Throughout the period he was able to carry on his work as an engineer without interruption.

iii In some uncomplicated cases where bilharzia infection was relatively slight the ova disappeared from the urine after only two intravenous injections of antimony. In severer infections the urine commenced to become clear after three or four injections and the ova completely disappeared at the end of six weeks. Four months later one of these patients reported that symptoms had not recurred but some cases which have undergone a course of intravenous injections still show the presence of mucous membrane and blood cells in centrifuged urine even though no ova can be found. This would seem to indicate that cystitis and other complications must be treated also. A case of haematuria of 18 years duration with a definite swelling in the region of the gall-bladder entirely recovered with disappearance of the tumour in six weeks after treatment.

iv A case of old-standing bilharzia disease complicated by renal calculus was cured by eight injections of tartar emetic, the total amount used was $9\frac{1}{2}$ grains over a period of one month.

R T L

COLLIGNON & MONZIOLS *Un cas de Bilharziose Vésicale traité par des injections sous-cutanées de Chlorhydrate d'Éméline*—*Bull et Mém Soc Méd Hôpt de Paris* 1919 Oct 16 Vol 35 No 27 pp 796-797

In a single case of bilharzial haematuria in a negro from the Congo the authors obtained a diminution of symptoms and disappearance of the bilharzia eggs after a course of treatment with emetine. Doses of 0.08 gm were injected subcutaneously daily for ten days. The haematuria then began to diminish and by the 15th day had completely disappeared as well as the pain on micturition.

R T L

ERIAN (A) *The Treatment of Bilharziosis by Massive Doses of Emetine*—*Practitioner* 1919 Nov Vol 103 No 5 pp 391-393

A patient suffering from acute amoebic dysentery and bilharziasis of the bladder was given 2 grains of emetine every other day, in all

on four occasions. A month later he reported himself cured of bilharziasis as well as of the dysentery. Thereafter the author tried emetine in big doses for bilharziasis and up to the present has had 50 recoveries and no failures. Although more than a year has elapsed since many of the patients commenced treatment haematuria has not reappeared in a single case. The author maintains that the method is easy to carry out and does not present the difficulties inherent in the tartar emetic treatment. [The dosage adopted would appear to vary but that given in the case quoted is 0.18 gm. rising to 0.2 gm. at intervals of 4 or 5 days. A second case received nine intramuscular injections in ten days starting with a dose of 0.1 gm. and increasing up to 0.14 gm.]

R T L

CAWSON (F. C.) **Insanitary Snails at Durban during the Winter Months**—*Jl Trop Med & Hyg* 1919 Oct 15 Vol 22 No 20 pp 189-190

Among the snails which infest the semi-stagnant pools at Sydenham one of Durban's suburbs, are a large number of *Physopsis africana*, one of the intermediaries of Bilharzia worms. There is need for eradicating this pest, which abounds on the rushes and water-lilies of these pools and it is desirable that more bore-holes or rain-tanks should be constructed for storage of water for drinking and washing purposes. A large number of the Indian children in the immediate neighbourhood paddle in these pools and are infected with *Bilharzia haematobium*. The author gives some notes of a cercaria which he names *C. spinosa*.

R T L

MILTON (F.) **Schistosomiasis in India**.—*Indian Med Gaz* 1919 Oct Vol 54 No 10 pp 368-370

The author continues his speculations on the existence of a "hypothetical Indian parasite" of the genus Bilharzia.

R T L

MAGATH (Thomas Byrd) **The Eggs of *Diphyllbothrium Latum***—*Jl Amer Med Assoc* 1919 July 12 Vol 73 No 2 pp 85-87 With 3 figs

From a detailed study of a large number of eggs of *Diphyllbothrium latum* the author concludes that there is so great a variation in their size that this alone is not of great value in identifying the species. The average length is 63.64 μ and average transverse diameter 47.33 μ . A diagnosis can be made with certainty, however, from the morphological characters of the egg-shell. There is the "cap on one pole and the small thickened nodule at the other" which in the author's opinion "clinches the diagnosis". [Good illustrations accompany the text.]

R T L

RILEY (William A) **The Broad Tapeworm, *Dibothriocephalus Latus*, in Minnesota**—*Jl Amer Med Assoc* 1919 Oct 18 Vol 73 No 16 pp 1186-1187

Dr NICKERSEN reported three cases of *Dibothriocephalus latus* in Minnesota. Of these two were Finlanders, and the third was a child of Finnish parentage who had been born in Minnesota and had never left the State. As KOPELOWITZ writing in the *Jl Missouri Med Assoc* in 1916 maintained that "there is very little evidence at present to justify an assumption that native foci exist in this country [U S A]," the author places on record in the paper under review two further cases acquired in Minnesota, both in children who had spent the whole of their lives in the State.

R T L

DE SCHWEINITZ (G E) & WIENER (Meyer) **1 Cysticercus of the Vitreous 2 Congenital Multilocular Cysts in Relation with the Retina 3 Anterior Lenticonus.**—*Jl Amer Med Assoc* 1919 Oct 18 Vol 73 No 16 pp 1187-1192 With 3 text figs

The paper describes and illustrates an interesting case of ocular cysticercosis in a patient who harboured a tapeworm [apparently *Taenia solium*] as determined by microscopical examination of the faeces. Ten months prior to the examination there was blurred vision of the left eye. This gradually increased and was associated with the appearance of white, cloudy masses floating in front of the eye. After five months these ceased to be apparent and not even a bright light could be distinguished.

At the ocular examination "quite anterior in the central field of the vitreous, and well in advance of the retina of the macular region, there was a large globular mass, light grey with a slightly darkened centre. The outline was regular and its border almost transparent. It was translucent towards the centre and was from 6 to 7 disc diameters in width. From its lower border there protruded a tubular extension transversely wrinkled which terminated beyond a slightly constricted neck into a head on which two bright dots and the position of the hooklets could be distinguished. Distinct peristaltic movements of the cyst were visible and the movements of the protruded head neck and body were often very active. At times the head was withdrawn within the sac."

An operation was performed to remove the cyst but twenty-eight days later the eye had to be enucleated.

R T L.

OKUMURA (T) **An Experimental Study on the Life-History of *Sparganum Manson*, Cobbold (A Preliminary Report)**—*Katasato Arch Experim Med* 1919 Vol 3 No 2 pp 190-197 With 2 Plates

Larval cestodes classified as *Sparganum* have been found not only in man but in monkeys, cats, pigs, wild pigs, rats, domestic fowls, domestic ducks, snakes and frogs. That they all belong to the same species is still undetermined.

The author has succeeded in tracing the life cycle of the *Sparganum*. He found dogs infected with an adult *Dibothriocephalus* apparently identical with that reared experimentally by YAMADA and YOSHIDA.

in the dog from a human Sparganum From the ova he successfully infected a Cyclops, *C. leuckarti*, and obtained the "procercoids" as described by ROSEN for *D. latus*

In the muscles of 30 to 40 per cent of the frogs taken in the prefecture Chiba, Japan a procercoid occurs which closely resembles that recorded from man The same form also occurs in the snake *Elaphe climacophora* By feeding these to a dog the author raised the adult form which gave rise to eggs identical with those obtained after the experimental feeding of a dog with the human sparganum The procercoids found in Cyclops were shown to pierce the intestinal wall of experimentally fed mice and frogs and live in the body cavity

R T L

VIOLETTE (H) & LE SAINT-RAT (L) Les porteurs de ténias Réactions spécifiques Reactions syphilitiques — *C R Soc Biol* 1919 Oct 18 Vol 82 No 25 pp 1033-1034

Working on the analogy that the serum of a syphilitic, will, in the presence of a known complement and a specific antigen (made from the liver of a congenital syphilitic foetus), fix the complement, the authors describe a series of reactions in which the serum of a patient suffering from tapeworm and a lipid extract of the body of tapeworm prepared by Noguchi's method are used in the same way as the syphilitic serum and syphilitic antigen

The results of the reactions in all cases were as follows —

(1) The serum of subjects suffering from tapeworm and *not* from syphilis gave a negative reaction in the presence of the lipid extract of tapeworm (tapeworm antigen)

(2) The serum of subjects suffering from syphilis gave a positive reaction in the presence of tapeworm antigen

(3) The serum of subjects free from syphilis and tapeworm gave a negative reaction in the presence of tapeworm antigen

(4) The reactions were identical in all cases whether syphilitic or tapeworm antigen was used

The conclusions drawn were —

(1) That the lipid extract of tapeworm behaves like an antigen, moreover like a syphilitic antigen, which confirms the non-specificity of the syphilitic antigen

(2) That the serum of subjects suffering from tapeworm does not appear to contain any specific substance which acts as an antibody

R T L

TURNER (M) & LEIPER (R T) On the Occurrence of *Coenurus glomeratus* in Man in West Africa — *Trans Soc Trop Med & Hyg* 1919 June 20 Vol 13 No 2 pp 23-24

A cystic tapeworm found by Dr W B JOHNSON in a tumour excised from the intercostal muscle of a native of Kaduna, Northern Nigeria, was presented to the London School of Tropical Medicine Such finds in the subcutaneous tissues of man have previously proved almost always to be *Cysticercus cellulosae* Dr JOHNSON's cyst differed from these in that it contained many invaginated "heads," i.e., was a *Coenurus* larva There are three references to the occurrence

of *Coenurus* in man, two of doubtful validity and the third a well authenticated case of *Coenurus cerebralis* figured by BRUMPT, in which the cyst occupied one of the lateral ventricles of the brain. There are at present 6 species of *Coenurus*, that which is the subject of this paper was described from the gerbille by RAILLIET and HENRY (1915). The species are distinguished by the size and shape of the hooks. The small tumour (2 by 1 cm) and its contents are described, and the hooks are figured in No 3 of the *Transactions*. The infection is ascribed probably, to accidental contamination with faeces from a carnivore harbouring the adult tape-worm which, so far, has not been described.

A G B

HOWARD (H. H.) **Pre-Natal Hookworm Infection**—*Jamaica Public Health Bull.* 1917 [1st year of Issue] pp 20-24

Ankylostome ova were found in the faeces of a baby 14 days old. Infection must have been pre-natal as the length of time necessary for ova to appear in the faeces after infection is 30-35 days. The mother was found to be suffering from ankylostomiasis so that the probable course of infection was through the placental circulation.

R T L

BLANCHARD (M.) **Géophagie et Ankylostomiasse**—*Bull. Soc. Path. Exot.* 1919 June 11 Vol 12 No 6 pp 322-323

Earth eating and, associated with it, intense infection with hookworm is of frequent occurrence around Grand-Bassam on the Ivory Coast. Children are especially liable. There is extreme anaemia with oedema, ascites and cardiac symptoms, death supervenes rapidly unless the case is treated energetically. Save where the case was too far advanced treatment with thymol cured the earth eating habit. The red blood corpuscles in some instances were remarkably diminished in number. The author gives 1,855,000 r b c per cmm and 30 Tallquist as occurring in extreme cases.

R T L

LEGER (Marcel) **Contribution à l'étude biologique de *Necator americanus***—*CR Soc Biol.* 1919 June 28 Vol 82 No 20 pp 770-774

In French Guiana the author found that the transformation of the rhabditiform larvae of *Necator americanus* into filariform larvae, in the open air, took place much sooner than was formerly supposed, the average time was 60-70 hours.

This has an important bearing on the prophylaxis of hookworm disease.

R T L .

DE FIGUEIREDO (Bonifacio) **A Ankylostomiasse na Marinha Nacional.** [Ankylostomiasis in the Brazilian Navy]—*Brazil-Medico* 1918 Nov 2 Vol 32 No 44 pp 345-349

The author quotes figures illustrating the serious prevalence of ankylostomiasis and other helminth infections in the Brazilian navy.

Histories are given of cases of intractable Ulcus cruris in which the patients were found to be infested with ankylostomes and ascaris, appropriate anthelmintic treatment being followed by rapid healing of the ulcers

F S A

YEN (F C) **Report on Hookworm Infection, Pinghsiang Colliery, Hunan**—*National Med JI China* 1918-1919 Dec & Mar
Vol 4 No 4 Vol 5 No 1 pp 140-145 57-66

Sanitation in native mines in China is entirely lacking, proper means of ventilation is absent, large number of persons work simultaneously. The temperature averages from 86°-96° F with 100 per cent humidity. Muddy water to a depth of 6-12 inches covers the entire floor, which, when mixed with faeces and urine forms an excellent culture bed for hookworm infections. The water collected in these mines is pumped to the surface and after inadequate filtration is used for drinking purposes. Typhoid, dysentery and severe diarrhoea are common among the miners.

R T L

ANONYMOUS [**Hookworm as Cause of Respiratory Disturbances**]—*Nippon Biseibutsugakkei Zasshi (Jl of the Japan Protozoological Society)* 1918 Feb 1 No 1

[From Review by R G MILLS]

In 40 cases of 'kabre' or hookworm dermatitis, 21 cases were found to show some signs of respiratory disease. Of these, 15 showed pharyngeal congestion and hoarseness, the other 5 also bronchitis. All but three of the four [? 40] were demonstrated to be infected with hookworm. In the sputum of 7 of these cases there was an excess of eosinophile cells. The author attributes these symptoms to the passage of the larvae through the bronchi and pharynx in their migration from the skin to the intestine.

R T L

MINAGAWA (K) [**Hookworm Development in the Old-Style Japanese Latrine 2nd, 3rd, 4th and 5th Reports**]—*In Shimbun (Med News)* 1917 Oct 25, Dec 10 & 25, 1918 Feb 10 Nos 984, 987, 988 & 991 pp 1394-1402, 1601-4, 1675-85 & 153-167

[From Reviews by R G MILLS]

The present investigation was primarily to determine the effect of surface area and depth of liquid in the latrines in relation to the viability of hookworm larvae. The larvae were artificially reared. The liquid used was obtained by centrifuging a portion of the contents of a closet and diluting it to the specific gravity desired. This was tested immediately after preparation in one experiment and in others after 24 hours to allow for bacterial readjustment and thus resembled those conditions obtaining normally. There was no noticeable difference in the results and thus no further light was thrown upon the oxygen requirements of the organisms from this standpoint.

Controls in common water gave living embryos at the end of 2 weeks but embryos under cultivation in hollow ringed slides did not live well when mixed with the dilutions used above

It was noticed that larvae could not reach the surface by crawling up the smooth sides of the tubes but could readily do so when inert matter was present

Maggots were occasionally found in and about latrines and the water washed from these yielded on centrifugation several hookworm eggs. This apparently constitutes an additional reason for the exclusion of flies from all collections of night-soil

Persons known to harbour hookworms were caused to use the family commode, which is found in most Japanese houses, in such a way that varying mixtures of urine and faeces would result. In some cases these were allowed to stand undisturbed and in others they were thoroughly stirred together. The free admixture of urine acted as a distinct toxic agent so that after 3-5 days there were no live eggs present, whereas in the unmixed faeces they could be cultivated after 30 days. Floating or solid masses in the bottom favoured the persistence of the eggs' vitality, but the simple act of stirring the mixture hastened the death of the eggs. Liquid faeces spread on damp sand which was kept moist with clean water allowed the eggs to hatch readily whereas the same faecal mixture placed alone in a dish in uneven masses did not yield any living embryos after 8 days

Encapsulated larvae from a culture placed in fresh urine sp gr 1.020, in a dish 2 cm deep and kept in the incubator will be found dead in 4 days but will remain alive until the 7-8th day at room temperature. When the urine has been kept in the incubator for 3 days previous to the test and has become opaque and turbid then the corresponding figures are 1 day and 3 days. The results were 2 and 7 days when a few drops of a faecal suspension was added to fresh urine. Controls lived in ordinary water in the dark, at room temperature, for 2 months even at a depth of 10 cm. This latter fact suggests that they could readily live in the bottom of rice fields and ditches. Direct sunlight in shallow dishes was found to kill the encapsulated larvae in a very few hours

Hookworm eggs and larvae are quite resistant in media which are approximately isotonic, but are readily destroyed in those of high or low specific gravity. They are destroyed in mixtures of human urine and faeces, but the destructive action of the urine was not manifested if the eggs were in direct contact with the air. The non-encysted larvae but not the encysted (integumented) forms are killed in mixtures of urine and faeces. The larvae are killed, however, if they are more than 0.5 cm below the surface of the mixture

As fly larvae spread the hookworm eggs, it is necessary to screen the latrines

Based on the above ascertained facts the author has devised a new form of reservoir for the storage of human excreta (for manure) which will obviate the danger of spread of hookworm eggs. He states that the proper proportion of urine and faeces is 3 of the former to 1 of the latter. The mixture should be mixed with 3 parts of water and allowed to ferment for a day or two, after being thoroughly shaken, before being spread on the land

R T L

IKEDA (Z) [**Hookworm Infection among the Japanese Soldiers of Formosa**]—*Taiwan Igakukai Zasshi* [*Jl of the Formosa Med Soc*], 1918 Jan 25 No 182 pp 107-108

[From Review by R G MILLS]

The author examined for hookworm and other ova the stools of 321 Japanese soldiers stationed at Tainan. Hookworm ova were present in 15.8 per cent, *Oxyuris vermicularis* in 12.5 per cent and Ascaris in 65.7 per cent. Filariae, [?] were found in 21 per cent of the soldiers examined. The stool examinations were made by direct microscopical examination without any attempt at concentration of the ova, so that these percentages are probably too low. Other statistical studies of hookworm infection among the troops have yielded about the same results. 12.7 per cent among the soldiers dispatched to North China in September 1912, 23 per cent in the 9th division of the army in October, 1912, 18.4 per cent in the 3rd division of the army. Among these soldiers the author has not found the constitutional symptoms often associated with hookworm infection, such as anaemia, headaches, tinnitus aurium, nausea, tachycardia and fatigue debility.

R T L

WARNER (Charles Horne) **Ankylostomiasis in London**—*Brit Med Jl* 1919 July 26 pp 105-106

The occurrence of ankylostome infection is recorded in a boy of 15 years who had never been out of England nor had visited Cornwall or other mining districts. He had not in fact travelled farther than Dover. Eggs were reported in the stool. At the post mortem "contrary to expectation only one mature ankylostome was found in the intestine." There was extensive tuberculosis in both suprarenals and the symptoms were doubtless chiefly due to this condition. [The diagnosis of ankylostoma in this case seems based on very unreliable evidence.]

R T L

1 SOLTAU (H K V) **A Case of *Ankylostoma duodenale* with Pyloric Obstruction**—*Lancet* 1919 Oct 18 pp 690-691

11 LANE (Clayton) ***Ankylostoma duodenale* with Pyloric Obstruction.** [Correspondence]—*Lancet* 1919 Oct 25 pp 756-757

1 In a member of the Expeditionary Force who had been in Egypt for 18 months there was pyloric obstruction with vomiting and a movable mass to the right of the median line suggesting a new growth. "Large masses" of the ova of *Ankylostoma duodenale* were passed in the faeces. "These were sufficient to give a definite character to the stools and attract the notice of the nurses," according to the author of the paper, but the bacteriological report simply says that there were "large numbers of ova which on cultivation yielded the typical rhabditiform larvae of *Ankylostoma duodenale*." The blood examined shortly after treatment showed an entire absence of eosinophils.

The tumour is attributed to the direct result of the invasion of the pyloric wall by the hookworm

11 In criticism of this paper Col Lane considers that the probabilities appear to be definitely against the association of hookworm infection with the symptoms of dysentery and the inflammatory pyloric tumour noted in the case, as the parasite lives neither in the colon nor in the pylorus

R T L

PEREIRA (David) **The Eradication of Ankylostomiasis in Ceylon**
Indian Med Gaz 1919 Oct Vol 54 No 10 pp 374-376

During the last few years many thousands of cases of ankylostomiasis have been treated in the island of Ceylon but no report has been hitherto published according to the writer. The eradication of the disease does not seem complete or permanent, mainly due to —

- 1 Lack of proper organisation
- 2 Heavy drinking by patients which causes diminution in the number of eggs
- 3 Deception and bribery of "Dispensers" by patients unwilling to be treated
- 4 Insufficient examination of faeces
- 5 Reluctance on the part of coolies to use properly constructed latrines

6 Reluctance on the part of the medical officer to use Thymol in cases of pregnancy, this can be done with little fear of untoward result if care is taken and small doses are given "Out of 33 cases so treated 24 went to term and were confined naturally"

8 The fact that treatment is compulsory only on the Estates and the rest of the island is untouched [Apparently the author has not seen the Reports of the International Health Board]

R T L

BARNES (M E) **Uncinariasis or Hookworm Disease**—*Med J of Siamese Red Cross* 1918 Dec Vol 1 No 3 pp 499-511

The routine treatment followed in the Chiangmai Hookworm campaign is as follows —

1 At bed time on the night before treatment $\frac{1}{2}$ oz of magnesium sulphate is administered to adults to partially clear out the contents of the upper intestinal tract. Purgation is not desired at this point

2 The next morning no breakfast is permitted but instead at 7 a.m. 20 grains of Thymol in capsule is administered to adults. At 9 a.m. another dose of 20 grains of Thymol is given. At 10.30 a.m. a purgative dose of magnesium sulphate is administered. Food may be taken at 12 or 1 p.m. if the bowels have been well moved. Fatty and oily food must be avoided on the day of treatment, also fruit and alcoholic drink

If oil of chenopodium is given, the same procedure is followed except that instead of the Thymol, one cubic centimetre of oil of chenopodium is given in capsule at 7 a.m., 1 cc at 8 a.m. followed at 9 a.m. by a purgative dose of magnesium sulphate. With children,

the oil of chenopodium is dropped into the proper dose of castor oil and the whole administered at one time, the dose being 2 drops of the oil of chenopodium for each year of the child. The maximum dose of oil of chenopodium was 2 cc and of Thymol 40 grs. If in hospital under proper supervision 50 grs may be given. As for the safety of the treatment 13,361 were treated with no untoward results. Dizziness, tinnitus and nausea sometimes supervene but these may be dispelled by an enema. Tubercle, nephritis, old age, debility and pregnancy are contraindicative to treatment.

R T L

KANTOR (John L.) **The Intra-Intestinal Tube Treatment of Hookworm Infection**—*Jl Amer Med Assoc* 1919 Oct 18 Vol 73 No 16 pp 1181-1183 With 1 text fig

As Gastro-Enterologist to the U S Army General Hospital No 14, the author had an opportunity of testing a new method of anthelmintic administration. Some of his 250 cases were returned gassed soldiers and pneumonia convalescents. The technique finally adopted was as follows.—The evening before treatment the patient is given a light supper chiefly rice and milk. There is no preliminary catharsis. Next morning at about 7 30 a m the duodenal tube is swallowed on a fasting stomach and the patient is kept on his right side until the bucket has passed the pylorus. With the buckets used this usually took place within three hours as determined by aspiration of golden yellow viscid bile negative to Congo paper. The drug oil of chenopodium in a dose of 3 cc is then injected. Six minutes later 2 to 3 ounces of a warmed saturated solution of magnesium sulphate are given trans-duodenally. This is an essential part of the treatment for it removes the drug quickly from the highly absorptive portion of the gut. The majority of patients have copious watery stools containing oil and sometimes worms within half an hour. The tube is removed after the salts have been given. In most cases 3 to 5 stools follow the first. Generally the patient is sick during the day of treatment. With this exact method of administering oil of chenopodium the author has studied its systemic effects and notices that the drug seems to have a selective action on tissues sensitized by previous disease or injury.

R T L

USAMI (K.) **[Complement Fixation Test of Serum in Uncinariasis]**—*Japan Med World* Tokyo 1919 Oct 5 No 303 [Summarized in *Jl Amer Med Assoc* 1919 Nov 15 p 1556]

In the *Journal of the American Medical Association* is a brief summary of the above paper [inaccessible in the original]. The serum of cases of uncinariasis in almost all cases gave a positive reaction with alcoholic extract of hookworm used as antigen. This was not the case with serum from normal persons and syphilitic and tuberculous cases which had proved free from any parasites.

R T L

BLACKLOCK (B) *Ancylostoma ceylanicum* in the Cat in Durban —
Ann Trop Med & Parasit 1919 Dec 10 Vol 13 No 3
 p 297

A ceylanicum is an occasional parasite of man in India. It has been recorded as common in the cat or dog in India and has also been found in Ceylon, Malay States and West Africa and Zanzibar. The specimens upon which the present paper was based were obtained by Dr CAWSTON in Durban.

R T L

STEWART (F H) **On the Life History of *Ascaris Lumbricoides*, L —**
Part IV — Parasitology 1919 Oct Vol 11 Nos 3 & 4
 pp 385-387 With 1 plate

Continuing his previous investigations on the migration of ascaris larvae in the body of the definitive host the author has performed three further experiments on young pigs. About 22,000 ripe eggs of *Ascaris suilla* were given to each of two sucking pigs. The one pig killed on the 14th day was found to harbour numerous larvae in the small intestine, caecum and rectum. The other pig was killed on the 19th day and was found free from *Ascaris* larvae. A third pig 2 months old was found to be naturally infected with *Ascaris*. After treatment with santonin the faeces were found to be free of eggs. About 50,000 ripe *Ascaris* eggs, one month old, were administered. When the pig was killed 31 days after infection no worms could be found in the alimentary canal.

The author describes in detail the anatomy of the larva of *Ascaris suilla* fourteen days after infection. The larvae measure 2.4 to 3.8 mm in length and are more advanced than those previously described from the trachea. "An ecdysis has doubtless occurred between the two stages."

R T L

RANSOM (B H) **A Newly Recognized Cause of Pulmonary Disease.**
Ascaris Lumbricoides — *Jl Amer Med Assoc* 1919 Oct 18
 Vol 73 No 16 pp 1210-1212

After summarising recent experimental work on the migration of *Ascaris* larvae through the lungs in experimentally infected animals, Ransom draws attention to the experiments made by MOSLER in 1867 and by LUTZ in 1888 in which pulmonary symptoms followed the administration to human beings of ripe *Ascaris lumbricoides* eggs and suggests that a careful outlook should be kept for pulmonary trouble in young children referable to natural infection.

R T L

YOSHIDA (T) [The Development of *Ascaris* 2nd and 3rd Reports] —
Tokyo Iji Shinji (Tokyo Med News) 1918 Mar 16 &
 Apr 27 Nos 2066 and 2072 pp 555-561, 867-872

[From Review by R G MILLS]

Ascaris larvae appear in the liver of experimentally infected animals after 1.5 to 7 days, most often on the third, fourth and fifth days, in the lungs from the 3rd to 15th day, usually on the 6th to 8th days.

When present in the liver and lungs, they are also found in the heart. They may appear in the trachea on the 5th day but usually on the 7th to 9th days, in the digestive tract on the 8th, but usually on 10th day or 11th day.

The eggs develop in 0.7 per cent HCl, 0.3 per cent carbolic acid, 0.7 per cent mercuric chloride solution, 4 per cent acetic acid, 5 per cent formalin, 7.5 per cent salt solution, 0.3 per cent nitric acid, 1 per cent caustic soda, and 5 per cent chloride of lime.

They do not develop readily in faeces which have been thoroughly dried.

The author found that *Ascaris* larvae in the definitive host pass from the lumen of the intestine through the intestinal wall and peritoneal cavity to the liver then through the lung, trachea to the oesophagus, stomach and back to the intestine, where it develops to the adult form.

This complicated course he regards as indicating a highly developed state of parasitism on the part of the parasite, from the point of view of evolution.

R T L

YOSHIDA (Sadao) **On the Migrating Course of Ascarid Larvae in the Body of the Host**—*Jl Parasit* 1919 Sept Vol 6 No 1 pp 19-27.

Two sets of experiments were conducted to ascertain the exact course of migration of *ascaris* larvae in the body of the definitive host (a) larvae were injected into the body, (b) ripe eggs were given by the mouth. A large series of experiments are quoted. Upon the results of these the author concludes that the course of migration from the intestine to the lung hypothesized by STEWART is merely an accidental one and that the normal route is as follows: "The *ascaris* larvae escape from the eggshell in the intestine of host and proceed to the abdominal cavity by boring through the wall of intestine. Thence they pierce the diaphragm to enter the pleural cavity, finally penetrating into the lungs from their surface." Larvae which pierce other organs may eventually perish or go back to the pleural or abdominal cavities.

R T L

YOSHIDA & HOTTA [**Resistance of Ascaris Eggs**]—*Jap Med World* Tokyo 1919 Aug 31 No 298 [Summarised in *Jl Amer Med Assoc* 1919 Oct 18]

The above paper is not available in the original but from this brief summary it is gathered that the development of the *Ascaris* eggs varies with the fluid in which they are kept. Formalin and sulphuric acid do not affect the external coating of albumen. They coagulate the "egg-white" and do not penetrate sufficiently to reach the embryo. In glacial acetic, nitric and hydrochloric acid solutions the embryos develop within the egg. On the other hand phenol kills the egg in a relatively short time. The most interesting observation perhaps is that *Ascaris* eggs do not develop in urine. After a considerable time they die.

R T L

YOSHIDA (T) [*Ascaris Infection in the Guinea Pig*]—*Tokyo Iji Shinji* (Tokyo Medical News) 1918 Feb 9 No 2061 pp 297-301

[From Review by R G MILLS]

The author fed eggs which had been incubated for long periods in moist sand, to 25 guinea-pigs, and studied the distribution of the parasites in the organs at intervals of 1 to 15 days. In animals examined between the 2nd and 6th days inclusive, the young worms were found in the liver, rarely after 7 days. They were found in most cases in the lungs 3 days and more after infection, and frequently in the trachea. In only 8 were they demonstrated in the intestine. In one animal they were found in the heart.

R T L

NISHIO (K) [*Ascaris in the Mouse*]—*Tokyo Iji Shinji* (Tokyo Medical News) 1918 Feb 9 No 2061 pp 305-309

[From Review by R G MILLS]

The author repeatedly fed to a mouse eggs which had been incubated 3 weeks or more. At death on the 13th day a large number of young worms were found in the liver, the exact distribution being described in detail.

R T L

DEGORGE (Armand) *Calculs des conduits biliaires développés autour d'oeufs et de débris d'ascaris*—*Bull Soc Med-Chirurg Indochine* 1919 June Vol 10 No 1 pp 48-52 With 1 plate

A remarkable case of gallstones is recorded. An *Ascaris lumbricoides* having passed from the gut into the bileducts remained there after death. A number of calculi formed around its body and also around masses of eggs laid by the worm. Clinical and postmortem notes are given.

R T L

ANONYMOUS [*A Statistical Study of Ascaris Infection Ascaris as the Cause of Fatal Obstructive Jaundice*]—*Chuo Igaku Zasshi* (*Jl of the Central Med Assoc*) 1918 Apr 5 No 275

[From Review by R G MILLS]

The author reports a case of fatal obstructive jaundice in which the common duct was found, at autopsy, to be completely obstructed by a large ascaris. There was no bile in the intestine. No other cause for the obstruction was apparent.

The following statistics as to the frequency of ascaris infection were compiled from the records of the Pathological Department of the Kyoto Medical School

Age	No of cases	No infected	Per cent infected
Under 1 year	230	0	0
1-2 years	65	7	10.7
2-3 years	27	8	29.6
3-15 years	166	62	37.3
Over 15 years	1,513	545	36.0
Farmers over 15	204	105	51.4

There was no difference between males and females As to occupations, farmers were most infected

R T L

BLACKLOCK (B) & O'FARRELL (W R) Note on a Case of Multiple Infection by *Dracunculus Medinensis*—Ann Trop Med & Parasit 1919 July 31 Vol 13 No 2 pp 189-194 With 1 plate

An Indian, 15 years of age, was admitted to the Tropical Ward of the Royal Infirmary, Liverpool, suffering from guinea-worm lesions of (a) right foot (1) immediately above the internal malleolus, (2) below and behind the internal malleolus, (3) outer side of the first phalanx of the second toe, (b) left foot (1) on dorsum of the fourth metatarsal, (2) below and behind external malleolus, (3) below and in front of ext malleolus, (4) inner aspect of dorsum of first metatarsal, (c) right hand (1) on radial side of base of first metacarpal, (2) on dorsum of first phalanx of middle finger

Both feet and hands were oedematous, swollen and tender Eosinophilia was 14 per cent but the faeces contained also ova of *Ascaris lumbricoides*, *Trichuris trichiura* and *Ancylostoma* Intravenous injections of antimony were tried but owing to the rapid progress of the septic condition resulting from the guineaworm lesions a fair trial could not be given

R T L

BIJON Sphacèle progressif de la jambe d'origine filarienne —Ann d'Hyg et de Med Colon 1914 Vol 17 No 3 pp 1009-1010 [Received in May 1919]

A case of Guinea worm infestation in which infection of the tissues set in as a sequel to the pointing of the worm at the internal malleolus Necrosis of the tibia and fibula occurred and the patient himself performed an amputation of the foot

R T L

LYNCH (Kenneth M) Filarial Periodicity —Jl Amer Med Assoc 1919 Sept 6 Vol 73 No 10 pp 760-763

The administration of nitroglycerine is followed by a decrease, while the use of epinephrin or pituitary extract is followed by an increase in the number of embryos of *F bancrofti* and *F immutis* in the peripheral capillary blood during the periods of peripheral prevalence and paucity

The period of cutaneous prevalence of *F immutis* embryos is directly connected with sleep In the collapsed lung of an infected dog the embryos of *F immutis* accumulate in enormous numbers During the period of cutaneous paucity there are in both species large numbers of embryos in the lungs The venous drainage of a part contains fewer embryos than the capillaries, there are still fewer when this accumulation is produced by vascular stimulation and following this the venous drainage contains larger numbers of embryos The author therefore finds a mechanical not a physiological explanation for periodicity

R T. L.

WYAKAWA (S) [Influence of Oxygen and Carbon Dioxide on *Filaria* Embryos in the Blood]—*Chu Gar Izi Shunpo* [Home & Foreign Med News] 1918 Feb 20 No 910 pp 196-202
[From Review by R G MILLS]

The peculiar fact that *Filaria* embryos appear in the blood only at night, and live in the lung during the daytime has suggested to some the possibility that this phenomenon may be due to differences in the oxygen and carbon dioxide tension in the blood and lung

In order to determine the effect of oxygen and carbon dioxide upon the duration of life of the embryos, the author carried out the following experiments

Into each of 6 flasks were put 16 cc of blood containing *Filaria* embryos (to which had been added enough 2 per cent sodium citrate solution to prevent clotting) Oxygen was then passed through the blood in 2 flasks and carbon dioxide through the blood of two flasks. The other 2 flasks served as controls. After the gases had been passed through them one set was kept at body temperature and the other set in the ice box

In both sets the duration of life of the embryos was shorter in the blood through which oxygen had been passed than in the blood containing carbon dioxide or in the control blood. In all the specimens kept at ice box temperature, the duration of life was very much longer than in the corresponding specimen kept at thermostat temperature. The embryos in the control blood flask and in the flask containing carbon dioxide lived about 3 weeks in the ice box.

To explain this prolongation of life at ice box temperature the author assumes that the embryos hibernate at this temperature and do not use up the nutritive substance in the blood, while at higher temperature their metabolism is more rapid and the food quickly consumed. He has noticed that the embryos in the blood kept at body temperature are more active than those kept at ice box temperature. The author explains the fact that the embryos live longer in the carbon dioxide blood than in the oxygen blood in the same way. He believes that they hibernate in the carbon dioxide blood, while in the oxygen blood they are more active and consume the nutritive substances more quickly

R T L

ROGERS (Leonard) Preliminary Report on the Intravenous Injection of Antimony in Filariasis.—*Lancet* 1919 Oct 4 pp 604-608

The remarkable effects of tartar emetic in kala azar and bilharzias induced the author to test its effects on filarial infections. The results indicate that repeated intravenous injections of safe doses of sodium antimonyl tartrate are followed by a diminution in the number of embryos in the peripheral blood and a great decrease in the activity of their movements just prior to this rapid diminution. The effects the treatment has on the adult worm or on the symptoms of the disease remains for further observation but the author considers that the data so far obtained are sufficiently encouraging to warrant a continuation of this line of investigation

R T L

ROUSSY **Traitement de la filariose par l'atoxyl**—*Ann d Hyg et de Med Colon* 1914 Vol 17 No 3 pp 868-873 [Received 1919]

Blood examination showed about 25 per cent of the French Colonial troops at Libreville to be suffering from filariasis. The symptoms were, lassitude, anorexia, wasting, heaviness of the head rather than true headache and troubled vision.

Injections of atoxyl were given once a week increasing at first from 0.5 grammes to 5 grammes, then falling to 2.5 grammes, these injections were given over a period of from 1 to 2 months. Only 5 cases are described, the conclusions drawn were that the general condition of the patients improved and whilst under treatment the numbers of microfilaria in the blood were diminished.

R T L

- 1 JAMES (R. R.) & HUNT (E. L.) **Notes on a Case of *Filaria Loa* (Subconjunctival)**—*Lancet* 1919 Nov 15 p 874
- 11 TYRRELL (Edgar J.) **A Case of *Filaria Loa*** [Correspondence]—*Ibid* Nov 22 p 946

These two brief notes draw the attention of medical men in England to the somewhat unusual history of eye symptoms associated with the presence of the *Filaria loa*. With the return of soldiers from the Cameroons cases of infection may be expected to occur in general practice in England.

R T L

HOLTH (S.) ***Filaria loa* i orbita og oielok**—*Norsk Magazin for Laegevidenskab*, Christiania 1919 Sept Vol 80 No 9 pp 939-940 [Summarised in *Jl Amer Med Assoc* 1919 Nov 15 p 1564]

A brief summary of a case of *Filaria loa* in which the worm appeared in the orbit several years after infection but owing to its rapid movements could not be removed by the surgeon.

R T L

- 1 ROBLES (R.) **Onchocercose humaine au Guatemala produisant la cécité et "l'érysipèle du littoral"** (Erisipela de la costa)—*Bull Soc Path Exot* 1919 July 9 Vol 12 No 7 pp 442-460 With 2 maps & 6 figs
- 11 BRUMPT (E.) **Une nouvelle filaire pathogène parasite de l'homme (*Onchocerca caecutiens*, n. sp.)**—*Ibid* pp 464-473 With 5 figs

Dr Robles' observations have already been summarised fully in this *Bulletin* [Vol 14, p 157]. The present communication is illustrated by some new text figures. The parasites are described by Professor BRUMPT as a new species of *Onchocerca* named *O. caecutiens*, after comparison with the specimens of *O. volvulus* collected by him in 1902 in the Congo. The new species differs in the number and size of the

genital papillae although these are inconstant in the genus. The spicules differ from those of *O. volvulus* only in a slight increase in length of the large spicule. [The author is inclined to rely on the morphology of the tumour rather than that of the parasite as a justification for creating at the moment a new species.]

R T L

KJERRULF (H) [Treatment of Oxyuriasis] -*Hygiea* Stockholm 1919 May 16 Vol 81 No 9 p 401 [Summarised in *Jl Amer Med Assoc* 1919 Aug 9 p 461]

A treatment recommended for oxyuriasis is as follows —Basic aluminium acetate 1 gm three times a day, given with a purgative of senna, sulphur, and compound liquorice powder. This is administered for 3 or 4 days.

To prevent reinfection the anus is smeared with an ointment composed of thymol 1 part, camphor 2 parts, quin sulph 2 parts, lard 30 parts.

R T L

REVIEW

ISTITUTO SIEROTERAPICO MILANESE L'Istituto Sieroterapico Milanese nel Primo Venticinquennio, 1894-1919 135 pp With 31 text-figs & 1 plan 1919, Milano. Con Tipi di Bertieri e Vanzetti.

This handsome work, finely printed and illustrated by good photographs, gives an account of the founding of the Milan Institute of Serotherapy, its activities during the first twenty five years, the scientific work done and the technical papers published, by the Director General, Professor Serafino BELFANTI, the Administrative Director Ing Giovanni DEVAIRE, and by Prof Domenico CARBONE. The subjects of the papers include microbiology, immunology, hygiene and zymology, and the media of publication are *Chimica Veterinaria* and *Bollettino del Istituto Sieroterapico Milanese*, a quarterly review, *Terapia*, is published also. A list of 204 publications is given.

A G B

TROPICAL DISEASES BUREAU

TROPICAL DISEASES
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MALARIA

WISE (K S) *Malaria, the Problem of British Guiana* *Brit Guiana Med Annual for 1919* pp 1-28

The author, until recently Surgeon General of the Colony, points out that the dangers of malaria are not adequately appreciated in British Guiana, where in the decade ending 1911 there was actually a "natural decrease" in the population, the deaths having exceeded the births by 2 267. This grave state of affairs is to be attributed to malaria, the principal effects of which are summarised as follows —

(a) Excessive number of deaths from Malaria especially in infants and children

(b) Excessive sickness from fever

(c) Destruction of the vital organs

(d) Decrease of births and increase of abortions, still births, premature births, and debilitated infants

(e) Excessive sickness and deaths from other diseases

(f) Severe epidemics

(g) Diminished mental and moral capacity

These are discussed in some detail

As regards (a) it is shown that from 10 to 20 per cent of all deaths in British Guiana are directly due to malaria and the special susceptibility of infants and children is demonstrated in the following table, which the author states is at the best a most unsavoury record —

Year	Total deaths of infants	No of deaths of infants from malaria	Percentage of No of deaths from malaria
1910	1954	488	24.9
1911	1868	391	21.0
1912	1879	365	19.0
1913	1885	377	20.0
1914	1811	279	15.4
1915	1799	344	19.1
1916	1583	287	18.1
1917	1781	319	17.9

Under (b) he shows how the work of the sugar estates is crippled by malaria. Thus out of 72,000 persons employed there are from 12,000 to 25,000 cases treated in hospitals every year, quite apart from those who do not go to hospital. In village and rural areas the conditions must be much worse. There is a heavy mortality amongst the children and infants of the black race and adults are not immune. In one village composed almost wholly of blacks, of 96 deaths in 1917-30 were due to malaria.

The evil effects of malaria and malarial relapses upon the vital organs are reviewed under (c), special attention being directed to such sequelae as anaemia and Bright's disease.

With reference to (d), Wise states that the well established evil results of malaria in decreasing births and increasing abortion are erroneously attributed to quinine, while as regards (e) he likens the victim of malaria to a reed shaken by the wind to whom the slightest change becomes unfavourable weather, his powers of resistance being diminished and his physical stamina undermined.

The influence of local and general epidemics is discussed under (f) and the very serious effects produced on the mental and moral capacity of the population are set forth under (g) where it is stated that "Malaria is the pivot on which most of our problems of public health balance, its basal influence is the substratum from which our difficulties arise."

Control is then considered, the exceptional conditions which make it so difficult in British Guiana being listed as follows —

"Firstly the inhabited part is a flat plain

Secondly the land is largely a heavy clay more or less impermeable to water

Thirdly the land level is four to five feet below high spring tides and therefore difficult to drain

Fourthly the rainfall is heavy—80 to 120 inches per annum

Fifthly there is a uniform summer temperature all the year round—72° F. to 90° F.

Sixthly—in all parts there are numerous canals and trenches vitally necessary to agricultural operations

Seventhly—Vegetation grows exuberantly "

The common anopheline nurseries are described and the methods adopted for dealing with them are detailed. The use of quinine is stated to be of secondary value and of minor importance in the control of malaria.

The last part of the paper deals with the results of control, which manifest themselves in four directions —

"Firstly, early reduction in the graver forms of attack and in the number of deaths from fever and convulsions. Secondly, with the general use of quinine a reduction of the milder recurrence of fever, or, if quinine be not generally used, the milder forms of attack will continue for several seasons owing to continued persistence of infection in the individual. Thirdly, the deaths and sickness from other diseases (e.g., pneumonia, dysentery, bronchitis, tuberculosis, etc.) gradually decline, indicating increasing stamina and definite resistance to mild infection. Fourthly, a decrease in accidents of birth and an increasing birth rate."

The author advances powerful arguments for an active campaign against the disease and points out that "a tithe of the resources now devoted to hospitals would amply supply walls against malaria and make much of the present hospital accommodation superfluous."

Suggestive statistical tables are appended.

[This is a valuable and convincing paper which furnishes facts and arguments likely to be useful to many hygienists in the tropics]

A Balfour

VAN BREEMEN (M L) *Verdere gegevens betreffende het malaria-vraagstuk Weltevreden en Batavia* [Further Data concerning the Malaria Question at Weltevreden and Batavia] - *Geneesk. Tijdschr. v. Nederl.-Indië* 1919 Vol 59 No 3 pp 311-344 With 3 Illustrations

A development of the author's indictment of the fish-ponds in the neighbourhood of Weltevreden and Batavia as a superlatively favourable breeding ground for the Anopheles and the chief, if not the only cause of the continued prevalence of malaria in and about those towns. An investigation of the splenic index in nine kampongs extending from north to south in a row, the most northerly being among fish-ponds and close to the sea while that at the southern end of the row is about 8 kilometres from the fish-ponds and 9½ from the sea, shewed that the index in children from 2 to 12 years of age varied inversely as the distance from the fish ponds and ranged from 100 per cent in the four kampongs nearest the ponds to 10 per cent in the kampong Pjakoeng at the greatest distance. The fish chiefly cultivated in the ponds is called "bandeng" (*Charos Charos* Forsk), it is a pure vegetable feeder and grows and fattens best and thus acquires its highest market value in ponds with a rich growth of weed. The weeds afford much protection to anopheles larvae from the larva-devouring fish "kepala timah" (*Haplochilus panchax*). Thus the "best managed" ponds are also the best breeding grounds for anopheles. The account given by the author of the investigation carried out by him in collaboration with Dr A L SUNIER, chief of the Fishery Station, is of great interest. Experiments were made to determine the rate of development of perfect insects per square metre of pond surface and per night in many of the different ponds, the method used being that described by Ross (Prevention of Malaria, p 166), a kind of tent like trap (klamboe) with a base of one square metre formed by four bamboo poles floating on the surface of the pond being suspended from the end of a flexible bamboo rod fastened to the bank. After the night the insects in the klamboe were counted. The average number of anophelines per klamboe in 876 trials during the months September 1918 to January 1919 was 44. This number was, however, under certain favourable conditions, greatly exceeded, as is shewn by the following table giving the "catch" of 4 "klamboes" on the night of November 15, 1918.

	Anopheles		Culex	Total
	♂	♀		
Klamboe I	1820	2461	482	4763
" II	256	315	84	655
" III	744	861	257	1862
" IV	2479	3313	258	6050

Experiments made with coloured mosquitoes gave important results proving beyond all doubt that, to quote the author, "Batavia

is over-run with anophelines from the fish-ponds, many of which have travelled distances far exceeding that usually taken as the average limit of their flight."

Red, blue and violet coloured mosquitoes were captured at distances respectively of 4.1, 4.9 and 6.2 kilometres from the points at which they were released after being coloured. In a note addressed to the Health Commission of Batavia, Drs van Broemen and SUMIER summarize the results of their investigations and give it as their considered opinion

(a) that the present source of the severe malaria endemic at Batavia is the brackish water and fish-pond area in its neighbourhood and especially the fish ponds themselves

(b) that there is only one certain method of rendering this area harmless namely, the filling in of the ponds and the thorough drainage and cultivation of the whole brackish water area lying to the north of Batavia

F S Arnold

PUNJAB Report on Malaria in the Punjab during the Year 1918, together with an Account of the Work of the Punjab Malaria Bureau by the Hon Col R C MacWATER, CIE IMS, Chief Malaria Medical Officer, Punjab - 4 + xxxviii pp With 3 charts & 2 maps 1919 Lahore Printed by the Supt Govt Printing Punjab Price Re 0-12-0 or 1s

The report states that it is impossible to estimate correctly the 1918 figures for malaria in the Punjab owing to the occurrence of influenza in pandemic form. The author presses for a simple nomenclature of disease for use in municipal towns and rural circles with the object of increasing the accuracy of vital statistics. "Fever," as he points out, is not a satisfactory term and may cover various maladies the correct diagnosis of which might nowadays be expected.

The increase of deaths due to "fever" in 1918 was enormous, the average annual number being for other years some 350,000, whereas in 1918 a total of over 1,280,000 was recorded, and of these the last three months of the year (when influenza was rife) claimed 1,006,650. How many of these were due to malaria it is impossible to say.

An unusually high "fever" mortality [in all probability largely malaria mortality] was noted in the earlier months of the year and before the beginning of the influenza epidemic.

Information is furnished regarding the spleen census carried out in the case of school children in 1918 and a comparison is made between the provincial spleen-rates and fever death-rates from 1914 to 1918 inclusive.

In years when the spleen-rate in November showed an increase over that of the preceding June, the fever death-rate for the year was relatively high but in 1915 when the spleen-rate in November was lower than in the preceding June the provincial death-rate was lower than in any other year.

Anti-malarial measures made little progress owing to financial reasons and paucity of staff due to the late war, etc. Quinization of school children was a failure owing largely to the lack of interest shown by the municipal officials and school authorities. The author

suggests that benefit might follow a more direct action on the part of the medical authorities

The work of the Punjab Malaria Bureau was also largely curtailed owing to exigencies arising out of the recent war

Charts, tables and maps are appended illustrating the various matters brought to notice in the report

A B

O'CONNELL (Mathew D) **When should a Patient, Invalided to England for Malaria, be considered Fit to return to the Tropics ?** [Correspondence]—*Jl Trop Med & Hyg* 1920 Jan 1 Vol 23 No 1 pp 15-16

A letter in which the author suggests that the specific gravity of the blood may be taken as the indicator as to when a malarial patient who has been invalided is fit to return to the tropics. The idea is based on the observation that water is retained in the blood and tissues of those who suffer from malaria, references to this condition having been made as long ago as 1827 by Sir John MACCULLOCH. LIEBERMEISTER said that in exceptional cases as large an increase of the body weight as 10 lb (4 kilo) may result from this retained water. ACTON and KNOWLES and others have demonstrated the lowered specific gravity of the blood in malaria. O'Connell therefore recommends that no patient should return to a climate where malaria is prevalent unless the specific gravity of his blood is either up to or exceeds (within physiological limits) that of the average healthy man. It is not contended that, by taking this standard of fitness, any additional immunity exists, but simply that the individual is cured of his malaria and in no worse condition as regards resistance to disease than the normal person. The suggestion is also made that a similar test will be useful in deciding whether a person going to a malarial tropical country for the first time is fit for the climate or not.

Further remarks are made on the influence of saturated atmospheres on the excretion of water from the body and, so far as malaria is concerned, the author enunciates the views with which his name is already associated [see this *Bulletin*, Vol 2, p 545, and Vol 8, pp 33-34]

[The author states that he advances his suggestion with diffidence and it is clear that further observations are required before the value of the proposed test can be definitely determined]

A B

MANSON-BAHR (Philip) **Experiences of Malaria in the Egyptian Expeditionary Force** —*Lancet* 1920 Jan 10 pp 79-85
With 6 figs & 1 map in text

This interesting and important paper deals mainly with epidemiological points of interest, the mechanism for microscopic diagnosis on a large scale under active service conditions and the gross pathology of the pernicious cases, in so far as it has a bearing upon treatment.

It is the outcome of the author's experience when serving for three and a half years with the Egyptian Expeditionary Force and describes conditions both in Egypt and Palestine. As regards the former the epidemiological conditions prevailing in the Canal Zone, the Fayoum and the Western Oases are briefly mentioned. A photograph of

Kharga Oasis in Upper Egypt is shown. The relative scarcity of anopheles in the Canal Zone is noted, the most abundant species being *Cellia pharoensis*. *A. turkhudi* and *A. mauritanus*. *A. turkhudi* was proved to be a vector *Cellia pharoensis* a vicarious transmitter of malaria, while *A. mauritanus* has never been shown capable of acting as an intermediary.

A special point to note as regards the Western Oases is the fact that malignant malaria could be transmitted during the winter season when the surface temperature of the sand at night-time was as low as 1°C. Here *A. palestiniensis* was apparently the carrier though the species found may merely be a variety of *A. turkhudi*.

As regards Palestine the experiences in 1917 and 1918 are recounted and are illustrated by photographs and graphs, the latter contrasting the incidence of benign and malignant cases.

As regards 1917 the author tabulates the main points as being —

"(a) The anopheles infected during the previous autumn appeared to be capable of conveying the infection during the winter to troops quartered in native houses. The cases mostly came from two infantry brigades who successfully held the same portion of the line (Auja River) and occupied the same billets.

"(b) Female anopheles (*A. bifurcatus*) were proved to be capable of laying ova during the winter season, and these ova were capable of hatching out and producing active larvae in sheltered places, as in deep wells.

"(c) The serious nature of the malignant infections. Three sudden deaths occurred a few hours after admission to hospital. Autopsies were performed and large numbers of parasites demonstrated in the tissues. The alarming nature of these fulminating cases can hardly be realised. One man was found dead on the march after a halt, while two others died three hours after admission to hospital.

"(d) The pleomorphic clinical forms which malignant infections could assume."

In 1918 an important step was taken in the formation of malaria diagnosis units, each consisting of one medical officer and two R A M C privates who had received special training. The equipment of these units is fully described, as is the method of work followed. These stations served two purposes. 1. By enabling accurate statistics to be furnished weekly to the "A D M S's" of the divisions and to the D D M S of the corps of the number of fresh infections occurring in different units, the type and location of the infection could be ascertained and steps taken accordingly."

2. They ensured, by early diagnosis, the early exhibition of quinine by the intramuscular route to all serious cases [italics in original].

The author gives a very useful and complete classification of the clinical symptoms of malignant malaria, which is here reproduced —

"I. Permeous or Rapidly Fatal Forms

Primary Clinical Diagnosis

Corresponding Clinical Variety of Malignant Malaria

(a) Cerebral (generally occurring in the summer)

"Sunstroke," "heatstroke"

Comatose or delirious type, with hyperpyrexia

"Mental derangement"

Maniacal type, with tendency to suicide

"Epilepsy"

Epileptiform type

"Cerebro spinal meningitis"

Cerebral type

‘1 *Pernicious or Rapidly Fatal Forms*—cont

Primary Clinical Diagnosis *(Corresponding Clinical Variety of Malignant Malaria)*

(b) Abdominal (generally occurring in the winter)

“Dysentery,” with blood and mucus	Dysenteric type
“Cholera” or “paracholera,” with diarrhoeic faeces and incontinence	Choleraic or algide form, with subnormal temperature and collapse
“Intestinal obstruction”	Condition due to gross infection of intestinal capillaries by malignant parasites
“Appendicitis” or “cholecystitis”	Various forms of referred abdominal pain in malignant infection

(c) Pulmonary (with pulmonary symptoms)

Bronchitis “pneumonia” ‘pleurisy’	Malarial pyrexia, with pulmonary congestion and cardiac distress due to myocarditis. Pain over left hypochondrium, due to rapid enlargement of the spleen
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(d) Cases with skin lesions

“Purpura” or “measles”	Septicaemic type of malignant malaria with multiple cutaneous haemorrhages
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II *Clinical Types of Average Severity*

(a) Influenzal or myalgic

“Influenza” or “rheumatism”	Pyrexia with joint pains
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(b) Enteric with steppage rise of temperature

“Enteric” sand fly fever,” trench fever,” relapsing fever”	Splenomegaly with pyrexia
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(c) Icteric with bilious vomit

“Jaundice” or “infective jaundice”	Bilious remittent form, with vomit of bile or coffee grounds, remittent pyrexia, and haemolytic icterus
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(d) Nephritic

“Acute nephritis”	Albumin, blood, and pus cells in urine
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III *Sequelae*

(a) Cachexia and anaemia

“Pernicious anaemia,” “leucocythaemia,” “debility”	Enlarged spleen and great anaemia due to blood destruction
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(b) Blackwater fever (methaemoglobinuria)

“Haematuria”	Methaemoglobinuria and pyrexia”
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The occurrence of strains of *P. falciparum* varying in pathogenicity in different countries is suggested to account for the comparatively high proportion of pernicious cases met with in Palestine

The chief points in connection with malaria in Palestine in the summer of 1918 are summarized as follows —

“1 On the seaboard and the plain of Sharon the benign variety predominates, while east of Jerusalem the converse was the case, with a tendency for the malignant disease to assume epidemic form in the autumn months, especially mid October (M T malaria is endemic in the Jordan Valley, the splenic index of native children in Jericho was assessed as

65 per cent and the parasite rate 54 per cent, mostly of the malignant type)

"2 The main mosquito intermediary in the benign tertian zone appears to be *A. maculipennis* and in the Jordan Valley *A. palestinesis* (other anophelids found were *A. superpictus* (or *A. sinensis*), *A. fragilis*, *A. bifurcatus*, and *A. turkhudi*)

"3 The incubation period of malignant malaria in epidemic form is one of from 10-14 days

"4 The efficacy of early intramuscular quinine (gr xiii in 2 c cm saline) early in the course of the disease (A point to note in the distribution of quinine is that ampoules containing sterilised solutions of quinine should be supplied to front line units, while stationary, or general hospitals can more advantageously utilise sterilised solutions of quinine made up in vaccine bottles with rubber caps)

"5 The fatal nature of the infection if undiagnosed and untreated for a period of five days

"6 The most acute cases die of heart failure (apparently a toxic myocarditis), and therefore stand rapid evacuation badly

"7 The undesirability of intravenous quinine in acute cases with cardiac involvement owing to the large numbers of parasites in the peripheral circulation it would appear that injection of large doses of quinine by the intravenous route destroys them with great rapidity, and in so doing floods the body with liberated malaria toxins which completely paralyse the cardiac mechanism

"8 The mechanism for early diagnosis and early treatment broke down on a rapid advance into a highly malarious country, with a consequent great increase in the number of fatal cases and pernicious infections

"9 The malignant tertian infection is much more amenable to quinine treatment than is the benign. This may sound paradoxical, but in the case of the former parasite it is a case of either kill or cure, and it is a remarkable fact that in Jordan Valley malignant infection relapses were not frequent. Very often a primary infection when treated early with quinine appeared to die out entirely. On the other hand, the benign infection, though amenable to quinine for the time being, relapses only too often in spite of it, and is therefore from a military point of view in many ways the greater obstacle of the two "

There are valuable notes on the bearing of the pathology of the disease upon the treatment of pernicious forms of malignant malaria and evidence was obtained that cerebral symptoms are due to toxæmia and not to mechanical blocking of brain capillaries. Intravenous saline proved useful in combating this toxæmic condition. The effects of intramuscular quinine upon the tissues are considered. Save when abused the method is valuable. Necrosis produced by it never led to pus formation.

The author comments on the break-down of the anti-malarial organization when the rapid advance northwards took place in September 1918 and suggests remedies for the future. He also advises the adoption of a standard method of differentiation between benign and malignant tertian parasites. As regards the former he considers the invariable enlargement of the red cell which it inhabits as a much safer guide than the presence of Schuffner's dots, which are not invariably present in early infections. In the case of the latter the important points are (a) its smaller size, (b) no alteration in size of red cell, (c) tendency to multiple invasion of same red cell, (d) presence of two nodules of chromatin.

A sketch map drawn to scale and showing the line of advance through areas infected with malignant malaria helps one to realize the conditions both in Egypt and Palestine

CARDAMATIS (Jean P) **Le Paludisme en Macédoine**—*Malarologia*
1919 Oct Vol 12 No 4-5 pp 65-82

This lengthy paper commences with a geographical and meteorological description of Macedonia, explaining the reasons for the prevalence of paludism in that country and describing its past history from the malarial point of view. An account of the mosquitoes found in the area is given, and the following anophelines are mentioned *A. claviger* (*maculipennis*), *A. superpictus* and *A. bifurcatus*. Modifications in the wing spots and size of *A. superpictus* are recorded. Cardamatis notes that during certain years, though breeding facilities are excellent, malaria is not prevalent and he maintains, as the result of experimental work, that adverse conditions during the winter months lessen the power of the mosquito for carrying infection—that is to say, a hard winter is followed by a mild malarial season no matter how suitable the breeding facilities for anophelines may be during the summer. The author states that this observation is supported by the statistics of past years (1854-1906) at Athens. The relative frequency of the various types of infection in Athens is, generally speaking, as follows: *Falci-parum*, 60 per cent, *Vivax*, 31 per cent, *Malariae*, 5 per cent, Mixed, 4 per cent. *P. falci-parum* infections are found to be relatively higher during the autumn and lower in the spring, *vivax* infections showing an inverse ratio. The Macedonian fevers are of the same type as those present in the rest of Greece and in general are more severe.

Amongst the author's conclusions the following points may be noted —

1 In Macedonia as in the rest of Greece there are four species of anophelines *A. maculipennis*, *superpictus*, *bifurcatus* and *pseudopictus* [*A. superpictus* var. *macedoniensis* is the same as *palestinensis*].

2 In Macedonia *A. maculipennis* predominates, elsewhere in Greece *A. superpictus*.

3 The malaria of Macedonia is not to be regarded as a peculiarly malignant form.

4 As the result of microscopic observations made throughout the past 18 years the average percentage frequency of the malarial plasmodia in Greece is —

	Summer	Autumn
Falci-parum	55	73
Vivax	34	14
Malariae	8	9
Mixed infections	3	4

5 Continuous or remittent fever is not cured by quinine administered on each of 4 or 5 successive days in doses of 1.5 gramme in the morning and 1 gramme in the evening and not of a malarial nature.

A B

SCHILLING (Viktor) **Ueber die schwere ehische Malaria** [The Severe Malaria of Cilicia]—*Arch f Schiffs- u Trop Hyg* 1919 Nov Vol 23 No 20-21 pp 475-498 With 1 map & 3 figs in text

This paper, illustrated by a map of south-eastern Asia Minor and furnished with several graphs, is on lines familiar to readers of the *Bulletin* who have studied recent reviews of German literature on malaria. It begins with a description of the Taurus and Amanus

mountain ranges and the adjoining littoral with special reference to the type of anopheline breeding places found in these regions. The sanitary relations of the Baghdad railway, so far as malaria is concerned, are also discussed. In the summer of 1916 malaria was present in this area in a severe endemic form, cases of malignant tertian being more common, though in the deep valleys near the plain benign tertian was more prevalent, while in autumn and winter the latter also predominated.

As a result of war and climatic conditions the disease assumed a virulent and malignant character. The danger had been recognised and the usual preventive measures, protection against mosquitoes and quinine prophylaxis, were in general use. The first cases amongst German troops were not recognized and were diagnosed as dengue, cholera, typhus, dysentery and so forth. The presence of an epidemic of sandfly fever mixed with sporadic cases of relapsing fever also led the medical officers astray, especially as microscopic examination was neglected. Indeed, cases were classed as a new disease termed "Febris taurica." The symptoms were severe and algid cases were not uncommon while deaths from coma were not infrequent.

The introduction of intravenous quinine injections averted fatal issues in the case of uncomplicated malaria but the ordinary quinine treatment, even in doses of 30 grains daily, proved unsatisfactory, relapses being common, and this gave rise to a suspicion that the disease was due to an unusually severe and perhaps quinine resistant form of parasite. This state of matters was seen both in men who had undergone prophylactic quinine and in those who had not received prophylactic quinine, but the author maintains that an absolute therapeutic resistance to the drug was present only in a few cases.

The failure of treatment was so marked that investigations were made as to the efficiency of the quinine employed. Quinine in solution or in capsules was found to be preferable but only because the tablets employed, while readily soluble, were unpleasant to take and upset the stomach.

Neosalvarsan was tried without permanent benefit.

Mechanical prophylaxis and anti-mosquito measures were only feasible under certain conditions and in certain places and quinine prophylaxis in various forms proved on the whole unsatisfactory. Schilling came to the conclusion, however, that it exerted a certain influence in the way of diminishing the total amount of sickness, in lessening the risk of fatal results, in delaying relapses and in causing a more rapid cure in the case of those who only sojourned for a short time in a malarial district. It did not yield the results which are to be expected from it in lightly infected countries. Excluding failures due to improper administration or avoidance of taking quinine there remained as possible reasons for inefficiency —

- (a) Bad quinine. Capsules only should be employed.
- (b) Complications. Dysentery, enteritis and more especially sandfly fever are cited.
- (c) War conditions. Poor food, fatigue, influence of climate, etc.
- (d) Massive infection and repeated super-infection. This is very important.
- (e) An unusually virulent and relatively quinine-fast type of malaria. The author regards this as the chief cause, even the benign tertian

cases being obstinate and severe. He cannot, however, subscribe to the view generally held that this resistance was due to quinine prophylaxis and he advances arguments in favour of his contention and records cases in its support.

He speaks highly of the value of quinine given intravenously in doses of at least half a gramme in the form of quinine urethane and good results were obtained with salvarsan, especially in benign tertian cases. At the same time a certain number of cures followed fractional quinine treatment after the methods of NOCHT and TEICHMANN, doses of 1.2 to 2.4 grammes being given.

Charts are exhibited showing the monthly incidence of the total malaria and of the malignant and benign tertian cases and indicating the change of type to which reference has been made, and the author reviews the literature on the subject, more especially papers dealing with the region to which his observations refer.

A B

PLEHN (A) *Zur Epidemiologie der Malaria*—*Arch f Schiffs- u Trop-Hyg* 1919 Sept Vol 23 No 17 pp 371-386 With 2 curves.

Plehn comments on the difficulties encountered in a study of the distribution of malarial infections throughout the year and their relation to the different periods of the year. These were not fully cleared up when the role of anophelines as vectors of the parasites was discovered. Certain epidemiological facts make a unity of species, together with a variability of the different forms of parasite, probable. As regards the long primary latency, with or without quinine prophylaxis, he previously brought forward several personal observations. War experience has shown that it is very common and an example was seen in Poland where such a latent period lasted from 6 to 9 months.

Different types of morbidity curve can be demonstrated, those with the most marked characteristics being (1) the Northern European, (2) the Central European, (3) the South European.

A definite curve of this nature can scarcely be described for tropical malaria because the monthly variations depend upon local conditions and are therefore irregular.

In the northern type the first cases appear at any time in March or the end of February. The highest incidence is seen in May or at latest in June, sometimes in April. There is a rapid fall in July while, with the onset of the cold autumn, and sometimes earlier if the summer is cold, new infections wholly cease. There is no evidence to show that hibernating anophelines are responsible for the spring epidemic, while the transmission of infection through the water stages of the mosquito is still in the realms of hypothesis. Although, as CELLÉ has shown, the cases occurring early in the year may be relapses yet most of them are really first attacks, the disease having remained latent from the previous year. Eight cases of this kind are cited four in Russia and four in Macedonia, in the latency of which quinine played no part. There are thus two types of cases, the latent case revealing itself in the spring or summer, and then the new infections occurring when the conditions are favourable for transmission of the parasite by anophelines.

The Central European type has been specially studied in the Roman Campagna. Here also the first cases, which are of the benign tertian type, appear early in the year. The first summit of the morbidity curve is reached in April. A sharp fall to June is followed by an abrupt rise in July and a further diminution in September, the summer-autumn incidence being predominantly of the small ring type, the aestivo-autumnal of the Italian authors.

Whether one regards the spring fever partly as a relapse of the previous year's illness, partly as a last year's infection which has remained latent during the winter, it yet remains obscure whence the infection of the summer fever is derived as long as the theory of markedly different species of parasites is held. The sparse summer fevers with large parasites may be regarded as relapses or as infections due to mosquitoes which have been infected from the early spring cases.

The third type is distinguished by the fact that the spring epidemic is quite insignificant, probably because the meteorological change is not so marked as farther north. Infections, including new infections, occur during the whole year, though they are usually rare in winter. The first attacks seen in the winter in countries where there are no infected mosquitoes in the late autumn must be the result of infection which has remained latent from the previous summer. A characteristic feature of the malaria in this region is, however, the rapid increase in fresh cases with the appearance of the great summer heat and rains and the sharp fall in their numbers in the autumn despite high temperature and the presence of many anophelines.

The various factors, chiefly telluric and atmospheric, which, together with unknown causes, influence the malaria curve, are operative both in temperate regions and in the tropics where, however, two other factors come into play, namely, immigration from malaria-free countries and the large local incidence of malaria.

Of special interest is the relation of relapses to fresh infections. In the Cameroons Plehn demonstrated that a true parallelism existed between their respective frequency curves and that neither was influenced by the abundance of anophelines.

The Italian authors have demonstrated the influence of protection by mosquito-nets on the frequency of relapses and this cannot be disregarded as CELLI has shown that in unprotected cases superinfection occurs. Both in the case of infections which have remained entirely latent, perhaps for many months, and in those which have been preceded by febrile attacks the same meteorological or general conditions which affect a whole population may determine an outbreak. This explains many epidemiological problems.

Plehn proceeds to draw further illustrations from observations carried out in Italy and Macedonia and on patients invalided from the Balkan front, and finally in an attempt to explain the change of type in malaria infection he advances the following hypothesis as a likely one —

The mosquitoes get infected with large parasites [benign tertian] in spring from relapse cases or early primary cases in which the infection has persisted from the previous year. As soon as it is warm enough they transmit the infection to man, who shows the corresponding type of parasite. Later under the action of the summer heat the parasites

in the mosquitoes assume other characteristics so that in the first place they acquire the property of destroying the red cells before there is time for large forms to develop in the latter, and secondly, of producing crescents. With these characteristics the parasites are transferred to man at the height of the summer and the mosquitoes newly infected by him cause the summer epidemic with small parasites. The mosquitoes infected in the summer die in the late autumn.

During the following months the infection in man weakens, probably under the action of the winter climate which is not favourable to the parasites. In the later relapses in many cases the large parasites with rosettes and spherical gametocytes reappear, provided the infection has not been stamped out. These later relapses with large parasites furnish the material for the infections of the next year, thus restarting the cycle. In N. Europe small forms and crescents are usually not seen because the temperature is too low to allow them to develop in the mosquitoes. Where the new human infections in the North cease at the height of the summer we may perhaps assume that the temperature during the year in question was not suitable for the development of the sporozoite broods even of the large forms, as KIRSCHBAUM demonstrated for the year 1916 in Poland. It is easy to explain the exclusive occurrence of the small parasites in tropical and equatorial countries by the uniformly high temperature in which the infected mosquitoes live throughout the year. When, however, in the case of relapses after home leave and residence in a cool country, or after the infection is weakened through treatment, the large parasites appear, even at the equator, one can no longer deny an action on the part of the human organism. How this takes place is not yet clear.

A B

REITLER (Rudolf) **Wechselnde Parasitenbefunde bei Malaria**
[Changes in the Type of Parasite found in Cases of Malaria]—
Wien Klin Woch, 1919 Nov 13 Vol 32 No 46 pp
1108-1109

The author comments on the fact that latterly much has been published regarding the change of type of the malaria parasite in the course of a malaria infection. He states that PLEHN observed this phenomenon in 1907 and points out the desirability of careful observations upon it as it suggests a yet unsolved problem in the biology of the parasites of malaria.

An opportunity of conducting such a research presented itself in the central hospital for malaria in Vienna, where patients could be observed for a sufficiently long period under suitable conditions, the necessary blood examinations being carefully carried out and the risk of reinfection excluded. From the beginning of February to the end of May 211 patients were under close observation. After explaining how the results were recorded according to the monthly findings and recounting certain difficulties in compiling the records, Reitler states that in malignant tertian cases there was a rapid fall from a maximum of positive blood findings in January to a minimum in February with thereafter a slight rise showing a maximum in April.

In benign tertian infections the period of greatest freedom from parasites was in February and the number of positive blood examinations rose steadily till May in accordance with the well-known fact that benign tertian relapses are chiefly seen in the spring

Mixed cases showed an almost constant fall in the number of tropical parasites as contrasted with a constant rise in the number of *P vivax* infections, the maximum of mixed findings being in March and April. Here again the chief parasite-free period was February.

This alteration in the parasites seen in one and the same patient is modified by (1) the "provocative" influence of high external temperature and strong light, these factors affecting equally both species of parasite, (2) treatment with quinine, *P vivax* being more susceptible than *P falciparum*. There are, however, exceptions to the general rule, not easily explained. Contrasting the behaviour of tropical and tertian parasites in cases of mixed infection it is seen that temperature and light are not the only factors concerned. The view that tropical infections may be less susceptible to these agencies than are benign tertian cases, or may even react to them in a different manner, is negatived by their well known behaviour during the true tropical season and by the observations of PLEHN, who, in patients showing only quotidian infection (*P ummaculatum*) in the tropics, found a change of type to *P vivax* when these patients had returned to Germany. The respective geographical distribution of both species of parasites is also against the hypothesis.

Four different periodicities in the life-history of the plasmodium must be recognized, that of schizogony, that of mobility and quiescence, that depending on the time of year, and the five yearly periodicity associated with the appearance of malaria epidemics and described by CELLI and others.

The change of parasitic type is only seen in the penultimate and raises the question of the duality or unity of the benign and malignant parasites. The author tries to solve this in the light of his observations and the above-mentioned findings of PLEHN, but admits that these cannot be explained either by the dual or the unitarian hypothesis. He therefore advances a theory in accordance with the latest views of GOTTSCHLICH in reference to the appearance and disappearance of infectious disease. As this, however, is entirely hypothetical no useful purpose is served by discussing it here, especially as Reitler admits that his observations do not prove his hypothesis and that, unlike PLEHN, he was working with cases infected chiefly in Albania in which the possibility of latent mixed infection could not be absolutely excluded even when apparently they were examples of a pure infection with one or other type of the malaria parasite.

A B

SIMONS (Hellmuth) **Malaria-Erfahrungen und kritische Studien über den Unitarismus.** [Experiences with Malaria and Critical Studies of the Unitarian Theory]—*Berl Klin Woch*, 1919 Oct 27 Nov 3 Vol 56 Nos 43, 44 pp 1009-1012, 1041-1043
With 3 figures

The first part of this lengthy paper is concerned with observations made upon 53 cases of benign tertian malaria, 12 cases of malignant

infection and one case of quartan fever. The parasitology of relapse in benign tertian malaria is discussed with special reference to the question of parthenogenesis. Although in 17 latent cases in which he performed splenic puncture the author failed to find any evidence of this process he does not agree with ROSS, THOMSON, CRAIG and BIGNAMI, who deny its existence, and he refers in this connection to the suggestive work of ACTON and KNOWLES on *Haemoproteus columbae*. They found that while the microgametocytes quickly perished the macrogametocytes proceeded to the formation of schizonts [This *Bulletin*, Vol 5, p 285].

He has paid special attention to the developmental relationships of the schizonts of *P. vivax* in the latent stage of infection and, in three cases examined daily by the thick drop method, noted that their development followed an extraordinarily slow, irregular course. This is best observed when the rosettes appear. The author for months saw the rosettes appear at irregular intervals of from 5 to 9 days but about 8 days before the occurrence of the relapses they reverted more or less to the tertian type. Further, he was able to establish that the development within one and the same generation of parasites is remarkably equal. Apparently the normal developmental rhythm of certain benign tertian cases may be lengthened in the latent stage.

In 90 per cent of all cases where a relapse, in which schizogony was present, was not treated or was insufficiently treated gametocytes in varying numbers were found.

The nature of the relapse in malignant malaria was studied in 12 cases but no certain evidence of parthenogenesis was obtained and Simon admits that the parasitology of relapse in *P. falciparum* infections remains obscure. Speaking generally, he believes malarial relapse in the great majority of cases is to be attributed to resistant schizonts and that in only a very small proportion of infections do the gametocytes play a part.

After describing the clinical features of a remarkable case of pernicious malaria and of a quartan infection he recounts his therapeutic experiences and declares himself a disciple of ZIEMANN and of NOCHT, whose methods have frequently been described in this *Bulletin*. In quinine resistant cases or where there was severe anaemia benefit often followed the exhibition of calcium lactate and calcium permanganate. Neosalvarsan and silver salvarsan proved in most cases unsatisfactory.

The second portion of the paper, in which numerous references to the literature are given, is devoted to a careful criticism of the unitarian theory. The author's war experiences as well as his previous observations lead him to oppose this hypothesis. For a full exposition of his arguments, which are set forth at considerable length, the original paper must be consulted, but it may be said that he claims support for his belief from a consideration of the cultural work carried out by ZIEMANN, BASS and others and from a study of certain cases which, however, have only an indirect bearing on the subject.

Further, he deals with the question of the influence of temperature on the malarial parasite, a point on which those who hold the unitarian theory lay stress, and cites the work of SACHAROFF, who fed a leech on blood containing *P. falciparum*, kept it on ice for four days, injected the blood into himself intravenously and suffered from a typical

pernicious attack Simon does not regard this experiment as conclusive evidence, but advances it as an argument against the view that variations in temperature can exercise a profound effect on the form of the plasmodium

He also points out that the unitarian theory, which is concerned with a morphological question, depends chiefly, not on morphological findings, but on epidemiological and clinical proofs

The evidence obtained from mixed infections is against the unitarian theory and in such cases faulty staining technique may lead to fallacious conclusions In this connexion he recalls his work, both with trypanosomes and with malaria parasites, more especially crescents In the case of the last-named he shows how errors may arise owing to inadequate staining when Giemsa's method is employed for thick-drop preparations and he concludes by giving details of a satisfactory staining method where a very thick blood drop is fixed in formalin by Ruge's method, stained with Manson's borax-methylene-blue and then treated like a paraffin section with alcohol and xylol

A B

SCOTT (Henry Harold) Coincident Malaria and Enteric Fever —
Ann Trop Med and Parasit 1919 Dec 10 Vol 13 No 3
 pp 195-214 With 13 charts

In this paper, which is furnished with good temperature charts, the author gives clinical details of 15 cases of illness in Jamaica which are considered as cases of combined malaria and enterica His observations lead him to the following conclusions —

(1) Coincident enteric fever and malaria is, at least in many instances remarkably mild both in type and course, recovery is rapid and complete, and more so than in the case of either infection separately

(2) Quinine has not any marked effect on uncomplicated cases of enteric fever

(3) The serum of patients suffering from uncomplicated malaria does not give a positive Widal reaction

[One cannot feel that the clinical accounts as given are absolutely conclusive as regards the enteric infection in the majority of cases and indeed the author himself regards his note as merely provisional In 10 of the cases cited diagnosis appears to have rested on one positive Widal and that not infrequently only in low dilution The cases would have been more convincing had consecutive Widal reactions been performed in every instance and a rising titre of agglutination been recorded or had more positive blood cultures been obtained In two cases a rising Widal was demonstrated]

A B

KAUFMAN (Bernard) The Relation of Malaria to Pregnancy —
New York Med Jl 1919 Dec 20 Vol 110 No 25 pp 1028-1030

The presence of malaria during pregnancy need cause no undue alarm provided the disease is recognized and adequately treated Treatment with quinine should be thorough and no fears need be entertained of the drug producing abortion, in fact, though usually

looked upon as an abortifacient, it has the very opposite action under such conditions. Malaria itself, untreated or inadequately treated, is almost certain to result in abortion, and the immediate treatment of the disease by quinine is the best means of prevention. Furthermore, the need for continuing prophylactic quinine during pregnancy is equally important, and the drug is best administered at bed-time.

Though albuminuria is common in pregnant malarial subjects this condition is not due to renal disease and, according to the author's experience, eclampsia is no more frequent in treated malarial subjects than in others. However, should malaria exist and remain untreated it is possible that eclampsia might ultimately result.

Quinine after parturition is also beneficial as it stimulates uterine contraction and assists involution. Furthermore, perineal lacerations heal badly in the presence of malarial infection and quinine promotes the healing process.

One must, however, be on one's guard in cases of pyrexia after delivery which do not yield to quinine. After 5 days' efficient administration the possibility of sapraemia and retained placental fragments must be carefully considered if the fever persists in spite of quinine treatment.

Another result of the routine use of quinine is the protection of the milk supply for the infant. A breast-fed baby whose mother is suffering from fever is not under the best conditions and though quinine may be excreted in the milk no harm will accrue to the child thereby. The routine treatment is also beneficial from the psychic point of view as it tends to allay alarm in the mother due to post-partum pyrexia, which she is apt to attribute to puerperal fever.

When quinine cannot be tolerated by the mouth it should be given intramuscularly. Kaufman advocates the use of a sterile solution of quinine and urea, starting with 1 c.c. of a 1 per cent solution. It sometimes happens that a preliminary intramuscular course enables the drug to be continued by the mouth without causing troublesome symptoms.

According to the author's experience malaria properly treated has no injurious effect upon the child. Pyrexia, which may commence as early as the third or as late as the eighth day after delivery, is very common and may suggest fears of puerperal infection but administration of quinine quickly causes cessation of the fever. It is the author's fixed rule to start quinine immediately after delivery in malarial subjects and continue it for about ten days. As to the cause of this post partum pyrexia it is suggested that the ergot usually given acts on the muscular coat of the spleen and so expresses plasmodia into the general circulation, thus exercising a provocative effect.

It may be useful to give the author's summary of his paper. He says

"Routine treatment with quinine during pregnancy is necessary to prevent abortion and miscarriage.

After delivery it is necessary, 1, to prevent reinvasion, 2, to hasten involution of the uterus and thus prevent postpartum haemorrhage and infections, 3, to aid in permitting perineal wounds to heal better, 4, to preserve normal milk conditions for the infant, 5, as a therapeutic test to rule out malaria in the presence of other infections, and 6, to maintain normal mental equilibrium of the mother."

A B

FORRESTER (A T W) Malaria and Insanity—*Lancet* 1920
Jan 3 pp 16-17

A paper describing the association of malaria and insanity as seen in the British Salonika and Black Sea Forces and based on an examination of 116 cases. The brunt of the attack usually falls on the cortical higher centres and gives rise to acute confusion of a cerebral type. Differentiation is, however, seen and paralysis of certain nerve groups or individual nerves may occur, such as involvement of the subtrapezial plexus, or the third or seventh cranial nerves. The cases may be divided into two groups (a) those associated with the actual malarial attack itself, and (b) those occurring as a result of repeated attacks. The former are the more acute but, *cæteris paribus*, have the better prognosis and are more amenable to treatment.

As regards (a) Mental confusion is the most prominent symptom, occurring in 68.75 per cent of cases, mental depression being next in frequency and amounting to 37.5 per cent. The mental confusion may vary from a severe delirium to a complete dissociation of personality, possibly accompanied by a distinct fugue. In the latter type, of which there were 9 cases, no less than 6 had a history of previous mental inequilibrium (feeble-mindedness, insane heredity, St. Vitus's dance) prior to contracting malaria. In nearly every case the patients were prisoners, having committed some breach of military discipline, and complete amnesia was invariably present and lasted from a few hours to three months.

Two cases of acute delirium were started by the malarial attack.

As regards (b) This group consisted of 37 cases, of which alcohol was the cause in 7 while in 9 there were varying degrees of feeble-mindedness. One case was returned 'Not insane'. In the remaining 70, in which malaria was the determining factor, it was found that any type of psychosis may be set up, but the prominent symptoms were still mental confusion and depression. Hereditary insanity was strongly in evidence and a history of this was present in 16 of the cases. The following table gives the types of mental disturbance noted—

Mental confusion	{with a definite fugue 9}	31
	{simple 22}	
Depression		24
Dementia præcox		8
Delusional insanity		6
Excitement with violence		1
		—
Total		70
		—

In chronic malarial poisoning the whole nervous system shares in the attack and hence the symptoms are very general and varied.

As regards prognosis a favourable result may always be anticipated provided no other causes are present. Quinine may with advantage be administered by the intramuscular method in cachectic cases. Cacodylate of soda proved disappointing. Removal from the danger of reinfection with malaria is essential.

It is important to recognize early "danger signals" and take precautions to prevent the patients being eventually stigmatized as mental cases. Amongst these precautions the author does not include quinine prophylaxis. He relies on general measures and, in appropriate cases, speedy evacuation from the area.

CUMSTON (Charles Greene) **Clinical Notes from France Malarial Splenomegalia**—*New York Med Jl* 1919 Nov 22 Vol 110 No 21 pp 853-855

Malaria is exceedingly prevalent in certain districts of Russia, especially the Caucasus, and in only about 11 per cent of cases, acute or chronic, is splenomegaly absent. In acute malaria the spleen averages 300 to 500 grammes in weight and may attain 950 grammes, in the chronic disease, especially in neglected cases with cachexia, it has been known to weigh 4,000 or even 5,000 grammes.

The pathological changes are described but nothing new is recorded though mention may be made of the occasional great development of the splenic vein, which in one case reached the size of the small intestine. A fibrinous exudate develops round the spleen and this leads to adhesions, which may be so numerous and tough as to render splenectomy impossible. The clinical picture varies according to the size of the organ, the extent of the adhesions and the degree of cachexia. In cases complicated by perisplenitis and cachexia the clinical signs are severe, the more notable being an alteration in posture, the body being thrown back, inability to stand erect for any length of time, general inefficiency, frequent desire to urinate, and haemorrhages. The symptoms usually accompanying severe chronic malaria are also present.

The results of splenectomy are satisfactory, recovery being rapid and cachexia quickly disappearing so that complete health may be restored. The operation has no influence upon the growth and development of young subjects and in women labour and pregnancy are normal after removal of the spleen.

The blood changes consist in an increase of white cells and the percentage of haemoglobin. They persist for several weeks or even years. At first the number of red blood cells is diminished from fifteen to seventeen per cent, but later it rapidly increases until it is only about one per cent below normal. After the lapse of a year it is greater than before splenectomy. "The number of white cells falls during the first few days following the operation and then goes up from thirty to sixty per cent above the normal count." This hyperleucocytosis disappears in two to three years subsequent to operation but a late eosinophilia has occasionally been observed. The haemoglobin at first falls to seventeen to twenty per cent and then gradually increases during the first year. There is usually hypertrophy of lymph nodes about five to six weeks subsequent to operation but it gradually subsides. Hyperaemia of the bone marrow and a decrease of urotoxins are noted with, in rare cases, hypertrophy of the thyroid. "Emelianoff is of the opinion that after splenectomy the lymph nodes and bone marrow take the place of Malpighi's corpuscles in their hemopoietic function."

The paper embodies the views of Russian medical men who have paid special attention to this important subject. A B

JONES (D W Carmalt) **Notes on some Occasional Manifestations of Malaria**—*Lancet* 1919 Dec 20 pp 1131-1133

This paper gives a useful account of the rarer manifestations of malaria, which may be missed unless the physician is on his guard but

which yield to appropriate treatment with quinine. The observations are grouped as follows —

Circulatory disordered action of the heart, myocarditis definite increase in the area of cardiac dullness and valvular murmurs

Respiratory bronchitis and broncho-pneumonia congestion of the bases of the lungs

Excretory albuminuria pain in the back casts in the urine oedema of the back and feet

Alimentary anorexia, vomiting, and possibly diarrhoea

Vascular haemorrhage from the lungs or bowel and in the retina thrombosis

Cerebral transient paresis, hemiplegia, Jacksonian epileptiform attacks increase of superficial reflexes, incontinence of urine and faeces. Under each heading illustrative cases are given

The advantages and disadvantages of the intravenous and intramuscular methods of quinine administration are contrasted, the former being contraindicated in cardiac and respiratory cases. The author has a preference in urgent cases for the intravenous route (20 gr in 15 oz saline which may be repeated once or even twice in the day if the fever does not subside) followed by oral administration. As a good rough indication of malaria (provided trench fever infection is excluded) the presence of areas of hyperalgesia over the distribution of the 8th cervical and 1st dorsal, the 7th dorsal and lumbar segments or some of these is of value

A B

ROSS (Ronald) **The Anti-Relapse Treatment of Malaria** [Correspondence]—*Lancet* 1920 Jan 3 pp 60-61

This contribution lays stress on the need for simplicity in the treatment of malarial relapses and points out that quite as beneficial results are obtainable from simple methods as from the more elaborate. The first formula suggested or used at the Tropical Diseases Clinic of the Ministry of Pensions is —

‘Quinnæ sulphatis

gr 80

Ac sulph dil

q s

Aquam

3 viii

Solus Half a sherryglassful (2 tablespoonfuls or one eighth of the bottleful) every day just before breakfast without fail. The bottle to be refilled once a week for more weeks.

The method of employment is given as follows —

‘(a) If at his first visit the patient complains of relapses within the last few days or weeks, or looks ill, or is a complicated case, or is apparently not to be trusted to take his medicine, we suggest or prescribe enough quinine for only one or two weeks, after which he must present himself again for examination (whether the parasites be found or not). But (b) if he appears to be trustworthy and not much ‘out of sorts,’ we tell him to return after four weeks, and we enter the word *three* before the last two words in the directions, so that he can get his medicine regularly from the chemist without troubling to see his doctor again in the meantime. In both cases, however, the patient is always told that if he does get a relapse in spite of the treatment he should take three doses (instead of one dose) a day just before meals for two days at least, and should see his doctor again as soon as possible.

Few such cases occur, and the patients are generally found to be much improved at the second visit. They are then given enough quinine for another month (the same prescription) after which they must report again. At this third visit they generally admit having remained quite free from relapses since the second visit and look still better, but it is advisable to continue the medicine for yet another month if possible, making 9 to 12 weeks of 10 gr. of quinine daily. The men, who soon recognize the benefit of the daily dosage, are usually quite willing to continue it for this period. At the fourth visit I am now stopping the quinine, as a rule, on reducing it to 5 gr. a day for another month, but I explain to the patient that this may possibly involve a relapse, after which the whole treatment must be commenced again, and I request him to report immediately if such a relapse threatens.

It is too early yet to ascertain the final results but the past experience of the author leads him to believe that they will be satisfactory, provided the quinine is actually taken as advised.

The sulphate is employed on the score of economy and is usually well tolerated. Early morning administration is recommended as most suitable for the working man and the quinine should be taken *immediately* before breakfast when it will be found not to cause nausea, while the taste is removed by the first mouthful of the meal.

The author infers that anti-relapse treatment on the lines indicated is having beneficent results, as out of 100,000 to 150,000 cases infected on the Eastern fronts during the war only 14,000 have been notified to the Ministry of Health since March 1st 1919. He trusts that the remainder have been cured.

A B

JAMES (S P) **Remarks on the Treatment of Malaria in England —**
Lancet 1919 Dec 6 pp 1016-1018

James confines his remarks to some of the problems confronting medical practitioners almost daily in this country and furnishes some very instructive statistics. Cases of malaria are now distributed almost everywhere throughout England and Wales and the following table shows its prevalence —

Notifications of Malaria in England and Wales, 1919

	Official notifications	Additional cases reported by Ministry of Pensions since Oct 4th, 1919
March	598	—
April	838	—
May	1528	—
June	1415	—
July	2381	—
August	2259	—
September	1366	—
October	1172	405
November (3 weeks only)	918	1247

The usual number of deaths registered as due to malaria in this country is between 50 and 60 per annum but from 1917 onwards there has been a marked increase, as shown in the subjoined table —

Deaths from Malaria by Years and Age groups

Year	Deaths from malaria in England (Males and Females)			Age groups of deaths from malaria during the first quarter of 1919	
	M	F	Total	Age groups	No of deaths
1910	44	7	51	Up to 15	1
1911	56	2	58	„ 20	17
1912	49	9	58	„ 25	15
1913	49	9	58	„ 30	9
1914	56	4	60	„ 35	12
1915	55	10	65	„ 40	7
1916	59	3	62	„ 45	4
1917	122	4	126	„ 50	—
1918	188	9	197	„ 55	—
First 3 months of 1919	70	0	—	„ 60	1
				Over 60	4
				—	70

The author comments on the disquieting fact that most of the deaths occurred in young men and mentions that lives might have been saved if medical practitioners in England had only possessed sufficient knowledge of the diagnosis and treatment of the disease. In this connexion he gives a brief account of a sad but instructive case where tropical malaria was mistaken for influenza.

As regards cases of malaria contracted in England as many as 414 had been reported during the period between September 1917 and the end of the third week of November 1919. Of these no less than 75 per cent have been children under 15 years of age.

Inadequate quinine treatment and its ill effects are considered and regret is expressed that in the latest edition of the “Ship Captain’s Medical Guide” the recipe of the “quinine mixture” still contains only two grains of quinine to the dose.

Suggestions for improved treatment are solicited, as it is desired to simplify or improve the rules of treatment laid down in the official pamphlet issued by the Ministry of Health [see this *Bulletin*, Vol 14, pp 266-267]. The author does not think any material change in the rules is necessary, for a simple and inexpensive routine is essential and the real trouble is to get such a routine conscientiously followed. Men suffering from relapses frequently do not apply for treatment to insurance practitioners charged with the duty of attending to them and efforts are now being made through the Ministry of Pensions to remedy this state of matters. In the country districts also adequate supervision is a matter of great difficulty.

The occurrence of household infections has shown how closely the arrangements for preventing the spread of the disease are connected

with those for ensuring adequate treatment and hence the establishment in London of a special malaria clinic by the Ministry of Pensions is a step in the right direction and one which should be extended to other parts of the country

A B

- i WILLCOX (W H) **The Treatment of Malaria** [Correspondence] —*Brit Med Jl* 1919 Dec 13 pp 796-797 Also *Lancet*. 1919 Dec 13 pp 1105-1106
- ii ROSS (Ronald) **Mode of Quinine Administration** [Correspondence] —*Brit Med Jl* 1919 Dec 27 p 863
- iii WILLCOX (W H) MAJOR (O H) **Mode of Quinine Administration** [Correspondence] *Ibid* 1920 Jan 3 p 28

i As a result of three year's experience of malaria in Mesopotamia Willcox considers that the intravenous method of administration gives the greatest therapeutic effect. He states that the therapeutic values of quinine bihydrochloride when given rectally, orally, intramuscularly and intravenously may be approximately represented by the figures 1, 2, 20 and 40. Thus 5 grains given intravenously would be equivalent in therapeutic value to 100 grains given by the mouth. [The question of the rapid excretion of quinine given intravenously is not considered.]

Subcutaneous administration is condemned and the choice of intravenous or intramuscular injection is said to depend in many cases on the presence of easily accessible veins.

Willcox states that in tropical countries acute diseases such as influenza, enteric, relapsing fever, heat hyperpyrexia, sandfly fever, etc., when they complicate malaria give rise to an acute and dangerous condition necessitating intravenous or intramuscular treatment without delay. [This, so far as enteric fever is concerned, is opposed to the findings of SCOTT in Jamaica. See above, page 252.]

In cases of malignant malaria and in recurring malaria of the benign tertian and quartan types the author advocates initial treatment with 3 to 6 injections by the parenteral method followed by oral quinine. His notes on dosage contain nothing new. Quinine idiosyncrasy is mentioned, notably a case of severe amaurosis. In such cases quinine must be stopped as, if continued, there is risk of fatal blindness. He believes the drug is more likely to manifest its toxic effects when given by the mouth.

ii A letter in reply to that by WILLCOX and inquiring whether his estimate regarding the therapeutic value of quinine bihydrochloride as given by different methods is a clinical or a statistical one and how the values are measured. Ross is very doubtful if the therapeutic value of quinine always increases *pari passu* with the dosage and cites evidence of his dubiety while requesting further details from WILLCOX.

iii Willcox explains that his previous communication was intended merely to emphasize the importance of intravenous and intramuscular injections of quinine in certain types of malaria which do not respond readily to oral administration.

Major gives a brief account of an outbreak in North Persia where the value of intramuscular and intravenous injections was clearly demonstrated.

A B

BRUCE-PORTER (Bruce) **The Treatment of Malaria** [Correspondence]—*Lancet* 1919 Dec 20 p 1169

A letter challenging the statement made by WILLCOX [see this number] to the effect that "Quinine in subcutaneous injection is liable to produce necrosis" and his advocacy of intramuscular injections. Bruce-Porter condemns the latter, which he says leads to necrosis and abscesses, and follows the method introduced by JOHNSTON which he describes as follows —

"The preparation of quinine is freshly prepared bisulphate and for the average sized man or woman the dose is 4 gr. This is dissolved in 20 minims of a 0.5 normal saline solution and injected into the subcutaneous tissue of the flank between the iliac crest and the last rib, using alternate sides. The main precautions are thorough cleansing of the site of injection and the use of an all glass syringe with a stout needle. The subcutaneous tissue should be broken up by the needle before injecting the fluid. The solution should be brought to boiling point in a test tube and injected while at a temperature of 100° F. This for three reasons: (1) It is more easily absorbed at this temperature, (2) if allowed to cool the quinine will separate out and jam the piston in the syringe, (3) it is not felt so much by the patient as it is isotonic. Before injecting the needle should be dipped in 5 per cent of carbolic oil, and after injection the side should be gently massaged with warm oil on wool for a few minutes in order to distribute the fluid. The injection should be repeated for five days consecutively. The after treatment is 1/20 gr. arsenious acid and 5 gr. quinine well diluted and by mouth in early morning daily for one month."

It is stated that the method was very successfully employed in East Africa during the war. [The reviewer saw it in use at Dar-es-Salaam where it appeared to be giving satisfactory results.] The writer goes on to say that quinine is not a prophylactic, in which view he again declares himself in accord with Colonel JOHNSTON.

A B

MOFFAT (R. U.) **Mode of Quinine Administration** [Correspondence]—*Brit Med J* 1920 Jan 10 p 60

A letter commenting on Sir Ronald Ross's note [see this number of the *Bulletin*] expressing a doubt "whether the therapeutic value of quinine always increases *pari passu* with the dosage" and stating that in a series of cases 2 grains four times a day caused the parasites to disappear as quickly as 30 grains a day. The author suggests that there is a fallacy in the reasoning as the mere disappearance of the parasites from the peripheral circulation does not signify cure. [Presumably Ross never intended his statement to convey such an idea.] Moffat points out that we must treat the patient, not the disease, and says he has never seen anyone suffer from over-dosage with quinine. He thinks if we must err as regards dosage it should be on the safe side and he does not consider that deductions as regards cure can be made from cases treated in England, as these are encountered at too late a stage. In this connexion he draws an analogy between malaria and syphilis.

A B

CLARK (S. F.) **Intramuscular Injection of Quinine.** [Correspondence]—*Brit Med J* 1920 Jan 17 p 99

The author, who has had a large experience in India, Aden, China and Mesopotamia, testifies to the great value of intramuscular injections

of quinine in severe cases of malaria and states that with proper precautions the risk of any bad effect is small. Indeed he considers that any medical man who allows a patient to die, or even to become seriously ill, from malaria without having used this (or the intravenous method) should be held to be gravely at fault.

A B

FRASER (HENRY) **A Note on the Treatment of Recurrent Malaria and Malarial Relapses**—*Lancet* 1919 Dec 20 p 1134

The author speaks from experience of some 8,000 soldiers who had been invalided to England owing to malaria contracted in one or other of the theatres of war. He maintains that it is essential to give the drug in solution and that 15 grains of quinine sulphate per day are sufficient to prevent relapses. Their occurrence under such treatment is due either to the patient not taking his medicine or to lack of absorption. As to the duration of treatment the author considers that under the conditions existing in military hospitals or concentration malaria camps 28 days is the limit of practicability. The interval between the conclusion of the 28 days of treatment and the occurrence of a relapse may vary from several days to several weeks. In the absence of treatment, or where treatment has been inadequate, relapses occur and are to be treated by 15 gr of quinine sulphate twice daily for five days and thereafter once daily. No importance is attached to the use of tonics, such as iron and arsenic. When blackwater fever supervened quinine was withheld while the urine was abnormal. Seven cases were observed and all of them recovered.

[The optimistic view as regards prevention of relapses is not likely to meet with general acceptance at the present time.]

A B

KAUFMANN (Paul) **Ueber die Wirkung von Methylenblau bei Malaria** [The Action of Methylene Blue in Malaria]—*Deut Med Woch* 1919 Dec 4 Vol 45 No 49 p 1365

Kaufmann states that he is able up to a certain point to confirm MAYER's findings as regards the action of methylene blue in quartan malaria [see this *Bulletin*, Vol 15, p 126]. He recalls good results from its use in tertian cases in Egypt as long ago as 1893 and considers it useful when there is quinine idiosyncrasy, though he thinks its employment should be supplemented by other medicaments such as euquinine, arsenic, etc. He cannot agree with RUGE's view that in quartan malaria it is as valuable as quinine and he only employs it in cases where quinine is contraindicated.

[Nothing is said regarding dosage.]

A B

KNOWLES (R) **Notes on a Monkey Plasmodium and on Some Experiments in Malaria**—*Indian Jl Med Res* 1919 July Vol 7 No 1 pp 195-202 With 4 Plates

In the author's opinion the best method of testing the validity of SCHAUDINN's theory of parthenogenesis is by either (a) cultural

or (b) animal experiment His paper is an account of his work in these directions which, though it yielded negative results, led to the discovery of an interesting new species of plasmodium in a hanuman monkey, *Semnopithecus entellus*

The cultural and animal experiments were carried out with *P. falciparum* obtained from a case of chronic malaria showing both small rings and crescents In the animal experiments rhesus monkeys, *Macacus*, were employed As stated, the results were negative in both forms of experiment

The hanuman monkey was inoculated intravenously with blood from another case of chronic malignant malaria which showed only crescents in the peripheral blood [Apparently the monkey's blood was not examined prior to injection] It died in 48 hours and at the autopsy a remarkable plasmodial infection was discovered which, it was recognised, had nothing to do with the human parasites with which the animal had been inoculated

The plasmodium is carefully described and illustrated by coloured plates Its peculiar feature is the existence of innumerable free forms, some of them undergoing schizogony while still extra-cellular They appear to have a definite cycle of development

The author believes that the shock of the anaesthetic, operation and the injection of foreign blood had stimulated a latent infection of a plasmodium peculiar to the hanuman species concerned and that the infection had suddenly become virulent and fatal He does not claim that the free forms represent a parthenogenetic process If they do, then it is parthenogenesis of this plasmodium only

From the second human case showing only crescents two healthy rhesus monkeys were inoculated but infection in them was not established and the author concluded that it was essential "(a) to use anthropoid apes as being possibly more susceptible to human malaria and (b) to devise some method of collecting crescents in enormous numbers suitable for the intravenous injection of massive doses in small volumes of fluid"

He obtained a specimen of the common anthropoid of Assam *Hylobates hoolock* [a species of gibbon] but unfortunately it escaped so he was unable to proceed on the lines indicated in (a) As regards (b) he mentions methods which he tried, but does not consider them in detail

A B

GUIMARAES (Aristides G) & CORTEZ (Mendonça) —Um caso de Quartan no Estado S Paulo [A Case of Quartan in the State of S Paulo] —*Annaes Paulist Med e Cirurg* 1919 June Vol 10 No 6 pp 130-133 With 1 plate

A detailed account of the microscopical and biological characters of the malarial parasite found in a case of quartan fever occurring at Ourintes in the State of S Paulo, Brazil The author concludes as follows —"To sum up, the parasite observed, clearly identified with *P. malariae* by the sum of its characters, yet differs from it (a) in the abundance of young annular forms and the rarity and imperfect development of gregariniform schizonts (b) in the abundance

of adult schizonts of rounded form and the rarity on the other hand of elongated forms (c) in the great number of parasites observed "

F S A

CHAMBELLAND Culture de l'hématozoaire du paludisme — *Presse Méd* 1919 Dec 20 Vol 27 No 78 pp 783-784 With 10 text figs

Having described the previous work of BASS in 1912 and that of THOMSON and McLELLAN of a later date the author gives a modification of BASS's procedure, which is as follows —

Instruments required (1) A 10 cc syringe and needle suitable for venous puncture, (2) Test tubes with apparatus for defibrination of the blood (3) Test tubes for incubation, (4) Capillary pipettes

Media employed (1) A 50 per cent solution of dextrose doubly sterilized, (2) A 7 per cent physiological solution of sodium chloride to each litre of which have been added 75 centigrammes of sodium citrate

Technique This depends upon whether one desires (a) the development of several generations of plasmodia or (b) a rapid examination to show the presence of the organism *In the case of (a)* Freshly drawn blood is slowly centrifuged, the serum and white blood corpuscles are removed by the pipette and the red blood cells alone retained. A quantity of warm physiological salt solution equal to the amount of serum removed is added, then dextrose medium in the proportion of 15 cc for each 5 cc of original blood. Mix thoroughly by rotating the tube and place in the incubator at 37° C. Specimens for examination are abstracted by pipette introduced about 1 mm below the top of the layer of red blood corpuscles. In order to keep the parasites alive it is necessary to remove the dead red cells every two days and replace them by healthy ones to which the plasmodia can fix themselves. One takes 5 volumes of healthy and carefully washed red corpuscles in a culture tube, one volume of the culture previously found to be the best, and the already given proportions of physiological solution and dextrose medium. Mix and incubate. Attempts at revitalizing the medium by NOGUCHI's practice of introducing freshly removed spleen or liver have not proved successful. Specimens obtained from spleen puncture are as suitable for culture as specimens from the blood.

In the case of (b), which does not allow of the development of other generations of parasites, the result is secured by defibrinating fresh blood in a test tube (a churning method must be employed, as to use glass beads is detrimental to the corpuscles). Without decanting the serum one adds 15 cc of the dextrose medium for each 5 cc of blood and examines in about 12 to 15 hours.

Results obtained Research was carried out with all three varieties of plasmodium. *P. malariae* and *vivax* were found too delicate to accommodate themselves to adverse culture conditions but *falciparum* can survive and go through its cycle of development. It was possible to preserve *falciparum* for 6 days and to infect healthy fresh corpuscles by new generations of merozoites.

This method has also been applied to apyretic malaria in which recent blood examinations by ordinary methods failed to show the presence of parasites. Young forms of parasites appear in 20 hours and have the characteristics of *falciparum*. They are derived from full grown forms too few to be detected by stained films.

Cycle of the cultures In 2 hours after sowing all rings are intracorpuseular, they have become increased in size and two nuclei are frequently present. In about 10 hours each ring is thickened and elongated its protoplasm is condensed at the opposite pole to the nucleus and assumes a crescentic shape, grains of pigment are present. In 20 hours the nucleus enlarges, its structure appears loose and somewhat fragmented and the protoplasm is frequently irregular in shape. In 40 hours the first appearance of segmentation is seen but more clearly in from 48 to 60 hours. Rosette

bodies are small and thin and composed of 3 or 4 divisions, each having a small nucleus which may be central or excentric. When the hour of segmentation arrives in a short space of time the merozoites are set free in the liquid of the culture. This is a critical period as they need to find healthy corpuscles for their continued development. In from 60 to 72 hours the merozoites have penetrated the red cells, and these are invariably fresh cells which have not been previously infected. The young forms are nearly always small. For one normal form there are four which appear deformed but the nucleus is always in the centre of a clear area. A large number of parasites disappear about the fourth day, but on the fifth or sixth day in nearly all cultures the division of schizonts may be seen. At this period one may observe mitotic division. Merozoites of the third generation gain access to fresh red cells but die about the seventh day.

In cultures of *P. vivax* after 40 hours one can see the transformation of the ring forms to the adult stage and division into 3 to 5 merozoites. Occasionally it seems that the commencement of gametocyte formation is observed. In every case, however, the parasites do not live more than 3 days.

A B

PEWNY (Walter) Ueber antihämolytische Wirkung von Sera Malaria-kranker [On the Antihaemolytic Action of the Serum of Malaria Patients]—*Wien Klin Woch* 1918 Oct 3 Vol 31 No 40 p 1084

The publication of MATKO's article on the inter-relationship between urine and quinine in haemolysis [this *Bulletin*, Vol 12, p 358] caused the author to record certain observations showing that the serum of malaria patients exhibits the property of preventing, or limiting, the haemolytic effect of hypertonic saline solutions. The nature of the experiments performed is shewn in the following table

	0.8 cc NaCl Solution	Sm	Erythrocytes	Haemolysis
1	0.8%	0.1	0.1	—
2	0.4%	0.1	0.1	—
3	0.2%	0.1	0.1	—
4	0.1%	0.1	0.1	—
5	0.05%	0.1	0.1	+

Sm = Malaria serum

Sn = Non malaria serum

— = No haemolysis

	0.8 cc NaCl Solution	Sn	Erythrocytes	Haemolysis
1	0.8%	0.1	0.1	—
2	0.4%	0.1	0.1	—
3	0.2%	0.1	0.1	+
4	0.1%	0.1	0.1	++
5	0.05%	0.1	0.1	+++

+ = Haemolysis

++ = Marked haemolysis

+++ = Very marked haemolysis

The reaction only occurred with fresh red cells but it was immaterial whether they were obtained from malaria or non-malaria patients or from rabbits. Whether the reaction is dependent on specific anti-haemolytic action, chemical influence, osmotic pressure, or specific gravity of the malaria serum remains undecided.

W Yorke.

AUSTEN (E E) **Anti-Mosquito Measures in Palestine during the Campaigns of 1917-1918**—*Trans Soc Trop Med & Hyg* 1919 Nov Vol 13 No 4 pp 47-60

This excellent account of anti-mosquito measures in time of war, which is too lengthy for detailed review, should be consulted in the original by those interested. The first part of the paper is divided into three sections dealing with the lines of defence successively taken up by the British troops in their advance, which were as follows—

(1) Wadi Ghuzze Line, March 24th-October 31st, 1917

(2) El Jehl-Wilhelma-Jerusalem Line, December 23rd, 1917-February 22nd 1918

(3) Arsuf-El Ghoraniyeh Line, March 22nd-September 19th, 1918

The author is careful to state that no new facts are disclosed but he gives very interesting accounts of the conditions found in the above areas, each of which presented its own special problems

In the first a stream with pools harbouring green alga (*Spirogyra*) and teeming with *A turkhudi* had to be dealt with, as had water holes dug in the Wadi by troops or camel-drivers. The eggs of *A turkhudi* are deposited in "ribands," suggesting a filled machine-gun belt

The construction of a large reservoir in the wadi proved beneficial by submerging many of the breeding places. Small fish, *Tilapia nilotica*, the Egyptian "Bulti," were introduced into the reservoir and thrive well but it was not possible to say if they were responsible for the disappearance of mosquito larvae. [This species of Nile fish is known to be larvivorous and has been successfully employed elsewhere]

In the second area, which included the Jaffa district with its orange groves, wells harbouring *A bifurcatus* were the chief source of trouble, though storage-tanks also bred out anophelines to a lesser extent. The fact that *A bifurcatus* bites and feeds greedily during the day is duly noted

The third line was by far the most important, on account of its extent, the large number of troops holding it and the highly malarious country through which it ran. The physical conditions differed greatly and the mosquito measures followed suit. On the west were marshy regions, the second largest river in Palestine—the Auja—and narrow wadis all containing water and for the most part choked by jungle. Further inland came the hills, with valley streams in which *A palestinensis* bred, and villages containing subterranean cisterns, the home of *A bifurcatus*. On the east was the pestiferous Jordan valley with breeding places of various kinds and one especially dangerous commencing in No Man's Land

The work carried out in these areas, which in the spring and early summer of 1918 were occupied respectively by the XXIst Corps, the XXth Corps and the Desert Mounted Corps, is considered in detail. The original must be consulted by those interested and it is well worth consulting, for the methods described show what can be achieved by unremitting care, attention and inspection in an intensely malarious country under the difficult conditions of field service when actually in face of the enemy. It is the story of a successful endeavour, for the incidence of malaria amongst troops occupying the areas

LEPROSY

MILLARD (R J) **Twenty-third Report on Leprosy in New South Wales, for the Year ended 31st December 1913**—*Report of the Director-General of Public Health, New South Wales, for the year ended 31st December, 1913* pp 144-151

On the 1st January 1913 there were 20 lepers in the Lazaret and 4 were admitted during the year. The total number received since the establishment of the Hospital in 1883 is 130-55 whites of European descent and 75 coloured patients. Fifty had died, and 50 were discharged or repatriated or had absconded. There were 21 remaining in the Lazaret on Dec 31st 1913. The new cases were coloured natives, one obviously very advanced. [This shows that such cases may long remain undetected in spite of the stringent regulations in force in New South Wales.]

Notes of the new cases are appended and a report of the progress of the cases remaining in December 1913. The principal treatment was Chaulmoogra oil, and sometimes strychnine. Improvements were noted in a few cases only.

P S Abraham

OLDRIEVE (Frank) **Leprosy in India The Problem**—*Times of India* 1919 Nov 19

The writer believes that there are probably at least 150,000 lepers in India—although the last census gave only 109,094. He quotes the following figures—

Bihar and Orissa 17,835, Bengal 17,485, Madras 16,858, United Provinces 14,520, Bombay 10,303, Central Provinces and Behar 7,307, Punjab 8,091, Burma 7,038, other districts 9,655. A case is recorded of its spread in a certain district in Madras, when 30 years ago there was only one known leper, but now there over 60 in one village. In all the large cities there are numerous begging lepers—probably at least 1,000 in Calcutta. An attempt to segregate the lepers has been made, and at present there are about 80 Asylums—42 connected with the Mission to Lepers, 12 Government or Municipal Asylums, 14 native State and 12 unclassified Asylums. [But a very small percentage of the cases are cared for in these homes, e.g. only 1,163 in Bombay.] The "mission" has 20 special homes for some 500 untainted children. Others are badly needed.

The "Mission to Lepers" is doing excellent work in India, but their efforts are badly handicapped by want of funds. It is to be hoped that the Government will again take up the matter seriously and recognize the need for more comprehensive treatment of the unfortunate sufferers.

P S A

ATAR (Jayme Aben) **Frequencia da Lepra no Estado do Pará** [Some Statistics of Leprosy in the State of Para]—*Brasil Medico* 1919 May 3 Vol 33 No 18 pp 137-139

A paper dealing with the age distribution of leprosy in the State of Para. The author quotes figures from the records of the Hospicio

dos Lazaros of Tocundaba which shew that during the years 1900-1918, of natives of Para admitted to the hospital with leprosy, the majority were under 20 years of age and a very large majority under 30. He says that, contrary to the general statement that leprosy is rare in childhood, it is, in Para, very frequent in childhood. He sums up as follows—In Para leprosy is in the main a disease of childhood. A process of auto-vaccination, due to slight and frequent inoculations is the probable cause of the comparative immunity of adult native of the State. He draws attention further to the fact that the incidence of leprosy does not coincide with that of paludism, is in fact largely its direct opposite. He asks

“Is not the ravaging of childhood by paludism an important cause of the rarity, if not the absence of leprosy in those parts of Para which suffer severely from malaria. I can see no other explanation of the extinction of leprosy in Gurupa, where, during the past 20 years, only one fresh case has been reported. No one can say that leprosy will remain extinct in that town but I can affirm that its frequency there began to diminish rapidly in 1893, the year in which malaria fastened its hold upon the town, not to relax it up to the present. These facts force me to conclude that among natives of Para leprosy is contracted during the early years of life, and that the contagion may confer an immunity which expresses itself in the insusceptibility to the disease of the adult native of the State.”

F S Arnold

MARTIN (Gustave). *La Lepre au Cameroun*—*Bull Soc Path Exot* 1919 Nov Vol 12 No 9 pp 613-621

Leprosy, which is very common among the natives of the Cameroons, is known as “Moulongo” in the Douala tongue, “Sam” in Yaoundé, and “Kountourou” in the Haoussa language. Its importance was recognised during the German occupation. In 1903-4, some 25 cases were cared for in the Duala Hospital, and a leper settlement was established at Cape Manoka. In 1905-6, 42 cases were under medical control. More active measures were taken in 1909 and subsequently, and several leper colonies were established, Mondoleh, Ebolowa, Yaoundé, and Garoua. The number of lepers in North Cameroon was estimated at 4,860,—the author considers this number quite within the mark. The French doctors are taking considerable interest in the matter, and a great many towns and villages now have leper settlements with sanitariums, visited from time to time by Government doctors.

P S A

BRADLEY (Burton). *Preliminary Note on the Apparent Transmission of Leprosy to a Macaque Monkey*—*Med Jt Australia* 1919 Nov 15 Vol 2 No 20 pp 414-416

On June 20th, 1918, small pieces of bacilli-laden material, from a non-ulcerated lesion of the eyebrow of a leper, were inoculated in the muscle of the right buttock and subcutaneously on the right breast of a macaque monkey. The skin wounds healed by first intention and not until towards the end of August was any evidence of swelling at the sites of inoculation or other reaction seen. The animal was chloroformed for a more satisfactory examination and

smears taken from the rounded swellings showed typical bacilli. Unfortunately the monkey was found dead 3 hours afterwards. Post-mortem examination showed numerous bacilli in the 3 nodules, and also in both axillary glands, in the left inguinal gland, and in the large tissue cells of the spleen. No pus was found in any of the lesions. In one superficial lesion in the buttock a giant cell was observed, bacilli were demonstrable in all.

Numerous cultural attempts with the original material were made by Noguchi's and other methods, anaerobic and aerobic, but contamination occurred and the cultures were discarded.

The author observes that "the production of granulomatous lesions after an incubation period of more than 60 days in the macaque monkey and the finding of the bacilli in the glands of the same and opposite side and also in the spleen, all of which bacilli looked quite normal and showed no signs of degeneration, seems to be worthy of record."

P S A

ITYENGAR (K R K) A Note on the Presence of Acid-Fast Bacilli in the Blood of Lepers—*Indian J Med Res* 1919 July Vol 7 No 1 pp 235-237

The author examined the blood of 40 cases in the Sabathu Asylum, and of 2 suspected cases sent for diagnosis. In no case was there any visible leprous lesion at the site of venepuncture. 1 cc of blood, with due precautions, was taken from the median basilic vein, mixed with 10 cc of a 2 per cent solution of acetic acid and centrifuged for 15 minutes. In 10 nodular cases, 4 were positive, in 20 anaesthetic, 1, and in 10 mixed, 2 positive. The blood films of 14 healthy persons, used as controls, showed no acid-fast bacilli.

In one case sent for diagnosis, the nodular lesions showed no bacilli, but they were found in the blood. He suggests that the blood examination should be used as a routine method of diagnosis in suspected cases.

P S A

BILLUPS (H B) Leprosy Diagnosed by X-Rays—*Jl Roy Army Med Corps* 1919 June Vol 32 No 6 pp 482-483

A Hindoo hillman from Almora came to the Glencorm Castle Hospital Ship with cough, laryngitis and wasting, but no tubercle bacilli were found in the sputum. The middle and ring fingers of the left hand were half the usual length, and the terminal phalanges of all except the thumb atrophied. A radiograph (illustrated) well showed the condition, and from this the diagnosis was made. He stated that the fingers had swelled up about 4 years ago, and had been "bad" for 6 months. With the exception of some indefinite pale areas on the arms, and anaesthesia of the ulnar side of the left hand, and doubtful thickening of the right ulnar nerve, no other leprous symptoms existed.

P S A

VAN ANDEL (M A) **Quelques figures de Lépreux dans l'Art Classiques des Pays-Bas** — *Janus* 1919 May June Vol 24 Nos 5-6 pp 135-145 With 6 plates

In this interesting paper the author quotes several of the early Dutch writers who seem to have connected leprosy with a fish diet. The disease appears to have been very prevalent in the Netherlands up to the middle of the 17th century, and numerous rules and regulations were enacted for their segregation in leproseries outside towns, although the lepers were often allowed to visit the cities on certain days for the purpose of obtaining alms. Five pictures by medieval artists are reproduced, showing mendicant lepers in different phases of the disease.

P S A

DENNEY (Oswald E) **A Photographic Study of Leprosy** — *Philippine Jl Sci* 1919 Jan Vol 14 No 1 pp 13-17 With 4 plates

An interesting and instructive series of photographs are here reproduced in 4 plates, showing the course of the typical lesions of the two principal types of leprosy—nodular and maculo anaesthetic. Although the initial lesions cannot be demonstrated with certainty the earliest recognised are shown in several cases. As the author remarks, it is not to be inferred from this series of photographs that each case of leprosy progresses by rule to a definite classical physical picture, there is perhaps no disease so capricious in the manifestations of its clinical progress.

P S A

CLELAND (J B) **The Occurrence of Carcinoma in the Liver of a Leper and of Squamous Epithelioma with Tuberculosis in a Cow** — *Jl Trop Med & Hyg* 1919 Aug 1 Vol 22 No 15 pp 147-148

The author alludes to the general impression that malignant disease rarely occurs in tubercular persons, and thinks it probable that this may be due to the high mortality of the two processes in a relatively short period of time, and to the fact that tubercle specially affects the young while cancer most frequently appears in the older. This may not apply to leprosy with its slow clinical course. In this paper he records a case at the Coast Hospital, Sydney, in which leprotic lesions with typical bacilli occurred in the liver of a middle aged Chinaman, together with numerous and extensive carcinomatous masses in the same organ. Bacilli were also found in the median nerve.

P S A

HIGHT (H Campbell) **Leprosy of the Eye** — *Med Jl of Siamese Red Cross* 1918 Dec Vol 1 No 3 pp 525-532

This interesting essay gives a résumé of the subject. BORTHEN found leprotic eye lesions in 75 per cent of anaesthetic cases and 90 per cent of the tubercular. Dr SILAV, in 500 lepers saw ocular affections in 401. The author found that in 101 Chinese cases, 77

showed eye lesions In a series of 23 cases in which the duration of the disease was known, 22 had the eyes affected As a rule, these eye lesions are seen earlier in the eyebrows and lids, and later in the eyeball It has been stated by some authors that ultimately about 30 per cent of lepers become blind He mentions the success that Dr CARTHEW has had with Sir Leonard ROGERS' gynocardate of sodium treatment and suggests that if this were adopted in early cases, we should see fewer cases of blindness in leprosy

P S A

- 1 HOLLMANN (Harry T) 11 DEAN (A L) Chaulmoogra Oil in the Treatment of Leprosy 1 Chaulmoogra Oil Mixtures 11 Fatty Acids of Chaulmoogra Oil—*Jl Cutan Dis* 1919 June Vol 37. No 6 pp 367-386

This is a very important communication on the subject In 1916 Drs McCoy and Hollmann published their results in treating leprosy by subcutaneous injections of chaulmoogra oil In 16 cases treated from ten to 17 months, 10 were improved, 4 remained stationary and in 2 the disease advanced Late in 1916 Drs CURRIE and Hollmann improved upon HEISER's and MERCADO's formulae, by injecting a mixture containing Iodine 1 gm, Ol eucalyptus 8 cc, Camphor 2 gm, Olive oil 147 cc and Chaulmoogra oil 150 cc, the maximum dose being 10 cc intramuscularly once a week Of 12 cases treated which became arrested two subsequently recurred, one within 7 months and one within 2 years All the cases showed no *B leprae* at the time of their "parolement" or, except in these two, for a considerable time after, in some as much as 2 years

In order to isolate the active principles which could be used in relatively small quantities less likely to cause such severe local reactions, Professor A L Dean separated and prepared "ethyl esters" of the chaulmoogra oil fatty acids These "esters" were more fluid than the original oil Four fractions "A," "B," "C," "D," were produced and intramuscular injections tried in 26 cases Fraction "A" and "D" caused the least amount of disturbance—the initial dose was $\frac{1}{10}$ cc each week, gradually increasing by $\frac{1}{10}$ cc Those that received Fractions "C" and "D" showed the greatest improvement In all the nodular cases there were local reactions at the site of the leprous lesions

The authors conclude —

"1 In the use of the ethyl ester of the fatty acids of chaulmoogra oil, subcutaneously, we have a method of treatment in leprosy superior to subcutaneous injections of the chaulmoogra oil mixtures 2 These esters when given subcutaneously have caused reactions in the leprous lesions with subsequent improvement 3 In 6 months' time large nodules have entirely disappeared, leaving deep craterlike scars 4 Of the 26 cases treated, seventeen showed marked improvement, three cases showed improvement, one case showed light improvement, and only three cases showed no improvement, being under treatment only 3 months or less 5 Of the 26 cases treated, 8 have become bacteriologically negative in less than two years "

Notes are given of all the above cases, and a review of the literature of the subject

P S A

ROGERS (Leonard) Further Experience of Sodium Hydnocarpate (Sodium Gynocardate A) and a Trial of Sodium Morrhuate in Leprosy With Notes of Cases by Jogesh Chandra MUKERJEE
—*Indian Med Gaz* 1919 May 1 Vol 54 No 5 pp 165-171

Sir Leonard Rogers considers that the sodium salt of hydnocarpic acid, obtained from *Hydnocarpus wrightiana*, is probably more active than that obtained from the true chaulmoogra oil (*Taraktogenos kurzu*) and is accordingly using this salt instead of what he called "Sodium Gynocardate A". He gives a further series of 14 cases so treated by intravenous injection, early in 1918, with notes. In only one case was there not much improvement. In several the lesions had all disappeared, the patients considered themselves well, and wished to return to work.

Of the 26 cases previously published, the further histories have been traced as far as possible. Ten were not traced, 2 died of influenza, 5 have remained well over a year, 1 showed no improvement, and 3 relapsed, 2 very advanced cases remain greatly improved and one slightly improved.

Taking the whole 40 cases in this and the previous paper, the results from the intravenous injections of the sodium salts of the fatty acids seem to be "a distinct advance upon any previous method of treating leprosy."

The author records three cases of prolonged febrile reactions after the intravenous injection in his first series. He thinks that this fever is probably due to the liberation of toxins in the breaking up of the organisms. He has only seen such injurious severe reactions in cases with greatly thickened tissues and consequent enormous numbers of bacilli. In these cases special caution is necessary—giving very small doses and at longer intervals.

P S A

ROGERS (L) Notes of Leprosy Cases treated by Subcutaneous and Intravenous Injections of Sodium Morrhuate—*Indian Med Gaz* 1919 June Vol 54 No 6 pp 218-220

The author has been using during the past year sodium morrhuate, in a series of 14 cases of leprosy—the notes of which are recorded. He considers it more effective by subcutaneous injection, producing very little pain or induration, and intravenously it is less irritating, although perhaps less effective than the hydnocarpate. In all but one case, the febrile reactions were very mild, but these were soon followed by improvement. He has given the two drugs alternately or together, with satisfactory results in obstinate cases. The breaking up and disappearance of the bacilli and good progress under sodium morrhuate, indicates that there is nothing absolutely specific against leprosy in the chaulmoogra oil products, and that other unsaturated fatty acids may yield effective preparations against the acid-fast bacilli.

He commences with $\frac{1}{4}$ cc gradually increasing by $\frac{1}{2}$ cc. to 2 cc.

P S A

CHATTERJEE (K K) Further Investigations on the Chemical Nature of Margosie Acids (Fatty Acids of the *Nim* or Margosa Oil) Recent Conclusions drawn from Experimental and Clinical Use of Margosates and Ethyl Ester Margosie *Ind Med Gaz* 1919 May Vol 54 No 5 pp 171-174 With 2 Plates

The author has treated several cases of leprosy, as well as syphilis and other skin diseases, with marked improvement by injections of potassium, sodium or ethyl ester margosates. A coloured plate is given showing great benefit after 6 months treatment

P S A

COOKE (J V) Complement Fixation with Acid-Fast Bacteria II In *Leprosy*—*Jl Infect Dis* 1919 Dec Vol 25 No 6 pp 474-492

This paper contains a comprehensive analysis of the various and recorded observations—which the author divides into 3 groups. (1) Wassermann reactions, (2) complement fixations with tissue extracts, and (3) tests with bacterial antigens. Table 1 shows that about 50 per cent of all the cases (1307) gave a positive result, 60 per cent in nodular, and 25 per cent in anaesthetic cases. Although a certain number of positive results may be due to a coincident syphilitic affection, we must conclude that the high proportion of positives indicates that infection with Hansen's bacillus may also produce substances causing a positive Wassermann reaction. Table 2 gives the results with alcoholic tissue extract antigens. In 210 cases, 52 per cent were positive—75 per cent in nodular, and 25 per cent in anaesthetic cases. Table 3 relates to 308 cases, 66 per cent being positive (84 per cent in nodular and 41 per cent in nerve cases). Table 4, giving results with tuberculin antigen in 180 cases, shows positive reaction in 68 per cent of the cases (84 per cent in nodular and 35 per cent in nerve cases). Table 5 gives the results with bacillary emulsions as antigens in 89 cases. In the nodular 93 per cent and in the nerve cases 58 were positive.

The author's own observations are upon 20 cases—with various antigens. He finally summarises thus—

"Leper serums contain complement binding substances that react with antigens of acid fast bacilli and gave an acid fast fixation similar to that obtained with serum of rabbits immunised with acid fast organisms. Some serums contain these antibodies in rather high concentration, notably those from cases of the nodular type, other serums show a relatively low antibody content. The serums of high titer may give a nonspecific fixation also with non acid fast antigens and with lipoidal (Wassermann) antigen, but only in comparatively low dilutions. This attribute of such high titer leper serums may explain a certain percentage of positive Wassermann reactions in leprosy. Certain acid fast bacilli have superior antigenic properties in complement fixation tests with leper serums. The acid fast reaction given by leper serums with acid fast bacterial antigens prevents the use of the complement fixation reaction in obtaining evidence of the etiologic importance of any acid fast organism isolated from leprosy."

A very full bibliography of the subject is appended, which enhances the value of this important paper

P S A

SUGAI (C) & KAWABADA (K) [The Viability of Leprosy and Tubercle Bacilli in the Alimentary Tract of the Fish and Fly]—*Igaku Chuo Zasshi* (Central Jl of Med Science) 1918, Feb 5 No 271 pp 1025-1038

[From Review by R G MILLS]

The authors determined by specific experiments that when carp and lampreys were placed in water containing either tubercle bacilli or leprosy bacilli the specific bacilli could afterwards be demonstrated in the rectum of the fish, and further, that in the case of tubercle the bacilli retained a certain amount of virulence—though less than was expected from their numerical strength—when inoculated in guinea-pigs

They also confirmed the established proposition that tubercle bacilli in unimpaired potency can be recovered from the gut and faeces of flies fed on stuff containing that species

P S A

SUGAI (C) & KAWABADA (K) [Value of Inoculation of Leprosy Bacilli in Prevention of Tuberculosis in Guinea Pigs]—*Igaku Chuo Zasshi* (Central Jl of Med Science) 1918 Feb 5 No 271 pp 1039-1042

[From Review by R G MILLS]

Six guinea pigs were vaccinated with an emulsion from a nodule of a leper. These with 4 controls were subsequently inoculated with tubercle bacilli. After 45 days two vaccinated animals and two controls were sacrificed. All 4 animals showed tuberculous lesions, but the process was believed to be more advanced in the controls than in the vaccinated animals, because the former had begun to lose weight, because their spleens were larger (2.0 gm and 1.1 gm, as compared with 7 gm and 5 gm), and because the controls showed more extensive lesions, especially in the lungs.

The remaining six animals were examined 80 days after the injection of tubercle bacilli, after the spontaneous death of one of the control animals. The vaccinated animals again are said to have shown less extensive lesions than the control animals.

He concludes that a slight degree of immunity to tuberculosis may be secured by a previous inoculation with leprosy bacilli.

P S A

MISCELLANEOUS

SHEEN (A W) *Clinical Observations in India during the War* —
Lancet 1919 Aug 16 pp 273-275

From this interesting record of a varied experience the following suggestive notes may be culled — Open ether as a routine anaesthetic, even in the Indian hot season, presented no difficulty, either practically or on the ground of excessive expenditure. Gunshot wounds from Mesopotamia, probably because of the relatively cleaner desert soil, did not suppurate so much as those from France. Head cases after recovery should not be sent back to a hot climate, where they seemed liable to headache and other symptoms. Aseptic operations did not seem to awaken latent malaria. Three cases of musculo-spiral paralysis following intramuscular injections of quinine came to notice. A series of cases of Oriental bubo occurring chiefly in barefoot British sailors, suggested infection through the feet, cultivations were invariably reported sterile. It is considered suggestive that sections of excised Oriental sore show invading columns of cells and cell-nests indistinguishable from those of epithelioma. A colleague, Capt W MACADAM, found proportionally more dysentery "carriers" among the general hospital assemblage than among those that were specified as cases of dysentery. Among typhoid-group complications osteitis of tibia, of humerus, and of metacarpals were seen, and one case where muco-pus taken from the gall-bladder gave a pure growth of paratyphoid A. Cobras and Kratts were familiar accessories of the Indian nocturne that struck the author's attention, and anti-venime and other necessities for treating snakebite were always kept in readiness.

A Alcock

ENTRICAN (J) *A Civil Surgeon at Headquarters in Upper Burma* —
Indian Med Gaz 1919 July Vol 54 No 6 pp 247-252

An abstract or summary of this delightful sketch of the Indian Civil Surgeon in harness would be as Olivia's sportive catalogue of her own beauties to Olivia herself. yet the cold official eye, howsoever oblivious of literary excellence or disdainful of Elian humour, cannot but distinguish much "mass and matter, rich in virtue and unmingled," that lies beneath the dainty play of its philosophy.

We may here select, as matter of general worth and relevant to the scope of this *Bulletin*, the author's remarks upon a first epidemic of plague in a station in Upper Burma. They show how, as in the old fable, the harsh wind—in this case of sanitary edict—only makes the distracted traveller fold his old customary cloak more tightly round him, and how the said old customary cloak can only be thrown off as the heat—or in this case the light—of the glorious Sun gradually grows in strength.

The first victim of the said epidemic happened to be an old friendless woman. Other cases following, the elders of the people declared that they were due to the poor old woman having been buried with her head pointing in the wrong direction, and asked permission "to rectify this grave error." Here is a typical illustration of the ideas

of cause and effect among the intelligent, but uninstructed peoples of the East. It is an illustration fit to be pondered by those enthusiasts who write in English text-books such things as that, for instance, the prevention of yellow fever is forthright a simple matter.

So hateful to the people were the measures of disinfection put in practice that they promptly nullified them by removing everything from the infected house before reporting a case.

Destruction of rats in a land of Buddhists is of all sanitarian dreams the most fantastic and futile. What co-operation, asks the author, can be expected from a clever and religious people who mercifully open traps to let the rats out, and thoughtfully destroy poisoned baits?

But, apart from Buddhist conviction of the sanctity of all sentient life however abject in regard, the author does not think much of rat destruction. His argument is that it must be continuous, which is an impossibility, also that the destruction of the rats in possession, many of which must have acquired immunity, may merely clear the way for an entering tide of young susceptible rats.

The author's conclusion is that, until the people of countries such as Burma gradually acquire an understanding of the general benefits of sanitation, the only method of eradicating a local outbreak of plague is evacuation of the infected area, it is the only method, in his opinion, that "has stood the test of time and experience, and has the supreme recommendation that it conflicts with no popular prejudice."

According to Thersites, in the play, the common curse of mankind is folly and ignorance. The author, in a vein as far as possible removed from Thersites, has given us a whimsical example of the twins of the curse working together for bad by reproving and circumventing one another.

A A

TAUTE (M) *Aerztliches aus dem Kriege in Ostafrika 1914-1918*
[The War in East Africa 1914-1918 from the Medical Side]—
Arch f Schiffs- u Trop-Hyg 1919 Nov Vol 23 No 22
pp 523-554 With 1 map in text

This lecture, given before a Medical Society in Germany, contains much that is of interest. The writer was Sanitation Officer with the Staff for the latter part of the campaign. The Germans who took part in the fighting numbered 3,000, and the African personnel 13,000—soldiers and carriers. Very few records could be kept owing to scarcity of paper, and such as were made were in almost every case lost.

There were at first 63 medical officers at disposal, and 5 veterinary officers. When Portuguese territory was reached 13 medical officers were left, and later only 6, of whom 2 were incapacitated.

An account is given of the shifts for clothing to which the force was reduced, and of the want of boots. Mosquito nets were retained and used by every European to the last. For food they came to be quite dependent on the country, and their natives were sometimes on very short commons, there was usually a great lack of fat, in the early days in Portuguese East Africa the food situation was often saved by hippopotami, which abound in the Lujenda river. At this time the daily marches were very exhausting, especially as halts had

to be used for obtaining food, riding animals were not to be had after 1917 and any that were obtained soon fell victims to nagana. These frequent changes of camp had, however, great advantages from the disease prevention standpoint. The natives were housed in small huts, which they preferred and were a guard against communicable disease. As long as they were in German territory the Europeans drank only boiled water, later this was not possible, but no epidemic arose. As latrines the usual trenches were used for the natives, but in standing camps the smoke latrine described by PETER proved most satisfactory*.

Each medical officer was provided with a microscope and a surgical outfit, two personal boys and a "sanitation boy", he had six attendants in all. This enabled him to move about freely and to be independent of carriers. A great anxiety was the procuring of quinine. Fortunately some planters in the Usambara hills had cultivated cinchona and so could provide bark, and more was obtained from the Agricultural Institute at Amani, from which quinine was prepared. Later a decoction of the bark was used, or the powdered bark. In May and June 1918 only 4 kilogrammes of quinine remained but at that time supplies were captured. Dressings, which were needed especially in 1917 for deep tropical ulcers on the natives' legs, soon gave out. A substitute was prepared from hammered tree bark, which could be sterilised, proved fairly absorbent and was quite serviceable.

Cotton wool was obtained by freeing from fat, raw plantation cotton. Ol Ricini, Tinct Uzara, Tinct Strophanthi, and Tinct Erythrophloe were prepared, the last as a substitute for digitalis. The castor oil was used for the immersion lens. Alcohol was prepared from grain, and a good substitute for benzene from a plant. Ointment bases were obtained from hippo or elephant fat, or from a mixture of wax and monkey nut oil.

With regard to individual diseases, tetanus played a very small part, though lacerated and dirty wounds were common, anti-tetanus serum was therefore not needed as a prophylactic. Gas cellulitis was infrequent. In the Lukuledi valley occurred several cases of severe eye inflammation and temporary blindness owing to the projection of the saliva of the spitting snake. Complete recovery ensued after a few days. [FITZSIMONS gives a good description of the habits of one of the spitting snakes with a photograph of a sheet of glass bespattered by it ("Snakes of South Africa" 1912 London Longmans, Green & Co)] There were several operations for appendicitis among the Europeans, this condition was diagnosed certainly among the natives 3 times only. It is noted that both shared the same diet.

No one came through without several attacks of malaria, and after a time the strength was more or less sapped thereby. At times 80 per cent of the Germans were ill. As before said, the supply

*This latrine was described with figures in the *Arch f Schiffs u Trop Hyg* 1914 Vol 18 pp 652-656. Its advantages are said to be —It can be used much longer than latrines which are filled up with earth, it is fly free, and causes no nuisance by its smell, for this reason it can be placed close to native barracks or hospital, attendance is cheap and easily earned by the black man.

of quinine was insufficient. Subtertian malaria was at first the more frequent, but later its place was taken by benign tertian, and the author says that the English had the same experience, most of the infections at the close of 1918 being of that variety. It was severe and very obstinate. Attempts to treat malarial natives in hospital without quinine, as a rule, failed. Likewise the attempt to cut short quinine treatment of the Europeans did not succeed, a total quantity of not less than 30 gm was necessary, 1 gm doses, and in severe cases 15 gm were given. The English, Taute says, had more malaria and lost more cases than the Germans, which he says was due to the fact that quinine treatment was neglected when the men left hospital. Blackwater fever cost the Germans, between 1914 and the end of June 1917, apart from wounds, 64.2 per cent of their losses. One case was treated by bladder irrigation with a view to stimulate the kidneys, he regards the method as a promising one. No cases were seen in natives.

As regards relapsing fever and the avoidance of rest houses, he says that such houses are a necessity for Europeans travelling without tents and baggage. An experiment which consisted in the use of cement and strictly forbidding native bundles being brought inside, was successful, relapsing fever continued to occur but not to such an extent as to be a menace to the force. Immunity was of short duration, two fresh, and severe, attacks occurred after 8 and 9 weeks.

Of *Trypanosoma rhodesiense* infection there were 23 cases, one of which was in a European who shortly before death had severe haemoglobinuria. Both amoebic and bacillary dysentery occurred, chiefly among the natives who suffered severely, the supply of emetine was so small that in their case it could hardly be used. In chronic dysentery irrigation of the colon was found very useful. There was evidence that amoebic dysentery depended to some extent on diet. In one part of the country where very little carbohydrate could be had and much meat was used, the disease was prevalent, it disappeared when a move was made to Lindi where carbohydrates were plentiful and meat scarce, and reappeared when the conditions were again reversed. Three cases are described which had the character of sprue, but the author hesitates to make that diagnosis, in one case only was the mouth affected. A milk and fruit diet proved very beneficial. Typhoid occurred and was met by protective inoculation with a vaccine made on the spot. Though there are several old plague foci in the country this disease gave little trouble.

Many of the natives suffered from ankylostomiasis. Thymol, B Naphthol and Ol chenopodi were lacking, but picric acid was used with some success. Strongyloides larvae were often found in the faeces, in one place in 10 per cent of the Europeans, the author believes that this infection can produce severe symptoms and instances a case which he followed for 7 years.

There were several cases of fatal hydrocyanic acid poisoning among the natives from eating bitter manioc. The prolonged cooking or soaking necessary for getting rid of the toxic principle was not always practicable.

Nervous symptoms suggestive of beriberi repeatedly came to notice, but the author doubts whether they were really that disease. Though the natives were fed often for long periods on spilt maize, pellagra was not seen. A short fever with a rash resembling measles or scarlatina

in both Europeans and natives is described. An epidemic of small-pox, cerebro-spinal meningitis and lobar pneumonia, or of these diseases in rapid succession, occurred in Portuguese East Africa, and was serious, rest was out of the question and proper isolation could not be maintained. The small-pox attacked many natives who had been successfully vaccinated some weeks before, no European suffered and few deaths occurred. Of cerebro-spinal meningitis there were only 17 cases. The cases in the epidemic of croupous pneumonia were quite characteristic, 250 natives suffered with 22 deaths, and 9 Europeans with 2 deaths. This was in August 1918, a time when the bodily strength was much diminished. Many patients had to go on foot owing to lack of carriers. This was distinct from influenza, which attacked the Germans after the Armistice on their way home, 11 out of the 155 succumbed. How many of the natives, Taute does not know.

A G B

MARTIN (G) *L'organisation médicale allemande au Cameroun* — *Bull Soc Path Exot* 1919 Oct 8 Vol 12 No 8 pp 531-535

This sketch of the German medical organisation in the Cameroons shows that there were three grades of doctors—military surgeons, civil medical officers, and sanitary officers—45 in all besides a number of inferior grades, in 1915 the number was to be increased to 53. The medical officers responsible for sleeping sickness preventive measures, 11 in all, were also in charge of measures against small-pox (vaccination), venereal diseases and yaws.

The budget of the medical department for 1915 reached a million marks, of which 10,000 marks were for quinine prophylaxis, 631,000 for sleeping sickness measures, 20,000 for leprosy and 30,000 for yaws and venereal diseases, 72,000 marks were set aside to pay the insurance premiums of the European personnel at work in sleeping sickness districts. Merchants and planters had to employ doctors on a scale which varied with the number of the employés and for every 250 a native assistant.

A G B

DANIEL (Gaston) *Inspections médicales dans l'Ituri (Congo Belge)* — *Bull Soc Path Exot* 1919 July Vol 12 No 7 pp 394-407

This paper deals shortly with sleeping sickness and at greater length with leprosy, much of the information is purely of local interest.

The Ituri District lies to the west of Lake Albert and the Semliki river and to the east of the Stanleyville district. Sleeping sickness is said to be very prevalent in the east of the Ituri District, that is, on the Semliki and shore of Lake Albert and streams draining thereto. On tributaries of the Ituri river, which drains to the Congo, there is tsetse but no trypanosome infections were recognised. It is in the Nepoko area in the west of the District that leprosy is so common. The amount of infection, with some details of cases, is given village by

village Around Mago, of 42,000 inhabitants 1,050 were recognised as leprosy, a percentage of 2.5, but the author thinks that the real figure is higher. He believes that there exist in the Nepoko area 20,000 lepers who should be isolated. He ends with some remarks on prophylaxis and treatment.

A G B

KULZ (L) *Pathologische und therapeutische Beobachtungen aus Niedermesopotamien* [Observations on Pathology and Treatment from Lower Mesopotamia]—*Arch f Schiffs- u Trop Hyg* 1916 Nov Vol 20 No 22 pp 487-496 [Received December 1919]

The author was in charge of a field hospital on the Turko-Persian frontier, and spent several months at Baghdad. Some of his observations are of interest. Baghdad he says is reputed free from *malaria*, however he himself saw several Germans with malarial fever who must have been infected there. At Bakuba, 45 kilo away, malaria is rife and anopheles swarm. *Kala azar* he diagnosed by spleen puncture in an anaemic Arab with large spleen and liver. He induced a colleague, Abdul KADIR, to make further investigations and states that in 12 sick persons whom he punctured the parasites were found 8 times. In the hottest time of the year, between the malarial seasons, a fever of short duration occurred which the author believed to be *pappataci fever*. *Typhus*, *relapsing fever*, *typhoid*, *dysentery*, and *cholera* are then touched on. *Sprue* was discovered, he believes, for the first time in that locality, whether one or more cases is not stated. There were the characteristics stools, reduction in size of the liver, and atrophic changes in the mucous membrane of the tongue. An account is given of *Baghdad boil*. A colleague inoculated infective material in the arm, the usual lesion was produced and in addition several others on a distant part of the body. *Tetanus* occurred in 9 per cent of the wounded, antitetanus serum was not used as prophylactic.

Stone in the bladder and *bilharziasis* were widely spread especially among the Arabs. *Hydatid cyst* was not infrequent. In one instance the cyst (splenic) was punctured and injected with 100-200 cc of a 1 per cent quinine solution, as much fluid being allowed to escape through the cannula as would do so without pressure. The patient was not kept in hospital and his recovery was uneventful.

A G B

VON DURING *Ärztliche Kulturaufgaben in der Türkei* (Nach einem Vortrag im ärztlichen Verein, Hamburg) [Civilising Mission of the Physician in Turkey]—*Arch f Schiffs- u Trop Hyg* 1916 Feb Vol 20 No 4 pp 73-90 [Received December 1919]

The first ten pages of this paper are purely political, pointing to the ways in which German medical men could push *Kultur* among the Turks (in 1916) to the benefit of Germany, though one gathers that the unpopularity of Germany in that country was a serious bar. The author then comes to the legitimate purpose of an article in a medical journal. *Syphilis*—The combating of this disease is regarded as amongst the most important tasks. In 1896 at Haidar-Paschar

the author found in the military hospital 150 patients with the diagnosis of "lupus" who were suffering from late syphilis. On enquiry he learned that to produce the prescribed 8,000 recruits from each district it was necessary in some districts, owing to syphilis, to call up as many as 22,000. For 4 years the author was studying the incidence of syphilis, examining in all 150,000 persons. "On the average 60 per cent of the population bore unmistakeable signs of recent or old syphilis." In some villages not a healthy person could be found. Between 1844 and 1890, he states, the population of Asia Minor went back from 12 to 7 millions, and between 1890 and 1896 another half million, though there was steady immigration of Musulmans from surrounding states, and for this he holds responsible military service and syphilis. Moreover Christians and Jews are increasing in numbers. Some districts are depopulated.

Syphilis is a comparatively new introduction to Turkey, as the author seeks to prove from old publications. Recent disease is more common among the children than among adults; he has examined schools in which of 150 children 100 had the disease, chiefly manifested by papules on the mouth, lips or tongue, and he states that it is spread by the use, for drinking, of metal cans or jugs with bent pointed spouts. Later manifestations are seen among adults, and in one village of 600 infected more than 100 had lost the nose. Nervous manifestations—optic nerve affection, tabes, paralysis—are very rare in the interior, but they are common enough among the Turks in Constantinople.

A few remarks are made on other diseases. *Leprosy* is not widespread. It occurs chiefly among the Spanish Jews at Salonica and Smyrna. Cases are rare in the interior. The teaching of ZAMBACO Pasha, the anticontagionist, has done much harm. *Tuberculosis* is described as fearfully prevalent. It cannot be combatted successfully till poverty is relieved by the remission of the taxation, 70 to 80 per cent of the harvest is taken by the tax gatherers. For this reason the mortality after operation for tuberculous bones and joints is very high.

A G B

JOUVEAU-DUBREUIL (H.) Notes sur la pathologie du Setchouen (Chine Occidentale).—*Bull Soc Méd-Chirurg Indochine* 1919 June Vol 10 No 1 pp 12-47 With 2 figs & 2 charts

Setchouen, or Szechwan, the large province in Western China with a population of 60 millions, is little known as far as its diseases are concerned. The climate is temperate. Exact figures are wanting and the enquirer has to depend on the few European doctors who practice there. The author and two colleagues have been in charge of a French hospital at Cheng-tu for seven years and it is on the information so obtained that this paper is based. The hospital is attended by the middle and not by the lower classes and comparatively few women are seen. It is noted also that purely "medical" diseases do not come much in evidence because the Chinese prefer their own methods of treatment.

Small-pox is endemic and gives rise to grave epidemics. Variolisation is practised. In the country, it is stated by the missionaries, in some

years half the babies are carried off by it. Vaccination is encountered with difficulties. Thus after the third month of the Chinese year it is usual to cease vaccination and not to resume it till the 11th and 12th months, even in the favourable period many days are unlucky, leap-year is considered bad. Vaccination is seldom done till the child reaches one year, and often not before it is five. No attempt is made to isolate for small-pox. The French Bacteriological Institute at Cheng-tu is the only centre in Western China where vaccine is made.

Rabies is uncommon, considering the number of dogs without masters. If a dog is suspected it is killed and its flesh consumed, the bitten persons should eat the heart which has preventive properties.

Relapsing fever was reported in 1911, it is endemic and causes severe epidemics in the spring and summer among the poor who are always lice infested.

Cerebro-spinal meningitis has been met with recently [see below]

Beriberi. This disease has never been reported from Western China. It is in point of fact common. At Cheng-tu it breaks out yearly among the garrison, especially in certain barracks. Last winter the author treated 28 mild cases the features of which he describes. All the rice consumed in Szechwan is decorticated by stone milling in a primitive fashion. It is dirty yellow in appearance and all the grains are more or less covered with fragments of the coloured superficial layer. Polished rice is unknown.

Leprosy is rare in Szechwan. The author has seen only 15 cases.

Plague is unknown but all the conditions for its spread are present, and there are foci in neighbouring provinces.

Cholera. Epidemics are rare. They occurred at Chung-King in 1893, 1900, and 1908 and a slight one at Cheng-tu in 1912. The author reminds us that the habit of eating only cooked food and drinking boiled water in the form of tea is a great safe-guard.

Under *mycoses* are mentioned a few cases of Madura foot, actinomycosis and sporotrichosis.

Gout is common in the mountainous parts and is not found elsewhere. Exophthalmic gout is not rare.

Pellagra has never been reported. Three typical cases have been seen in men who lived on rice like the rest of the Chinese, and the author here describes what he believes to be a fourth.

Elephantiasis exists but is uncommon, cases of elephantiasis of the penis and legs are figured. Filariasis has not been met with.

Appendicitis is relatively rare. Two cases reported were in cooks attached to European households. The author thinks the disease may be really as common as in Europe.

Tabular statistics are given of the cases seen at the French hospital during seven years. In addition to the diseases already mentioned and a large number of others it includes typhoid fever, malaria, scarlet fever (3 cases), diphtheria (8), amoebic dysentery (661), acute articular rheumatism (236). [Bacillary dysentery is not mentioned.] A chart shows that the diseases most frequently treated were, in the order named, malaria, tuberculosis, syphilis, amoebic dysentery. Curves give the monthly incidence of relapsing fever, malaria, and amoebic dysentery. The two last have their acme in August, Relapsing fever reaches its maximum in June.

YOUNG (W J), BREINL (A), HARRIS (J J) & OSBORNE (W A)
**Effect of Exercise and Humid Heat upon Pulse Rate, Blood Pressure,
 Body Temperature and Blood Concentration—*Proc Roy Soc*
 1920 Jan 1 Series B Vol 91 No B 636 pp 111-125
 With 1 chart**

The work described in this paper was done at the Australian Institute of Tropical Medicine, Townsville. The authors refer to experiments in which it was attempted to reproduce tropical conditions in Europe, and observe that conclusions of real value can be drawn only from observations actually carried out in a hot climate.

The following experiments were carried out in Townsville during the hottest months of the year (January to March) during which time the wet bulb temperature stands between 75° and 80° F occasionally even above, and the dry bulb temperature between 80° and 90° F, the degree of saturation of the atmosphere is very high, and the climate "trying." The climatic conditions—rainfall and temperature—in Townsville correspond, according to Griffith Taylor (1918), to those in Calcutta, with the exception that the humidity is slightly lower."

The observations were made on seven subjects of the staff of the Institute and extended over two wet seasons. The experiments were of three kinds, (1) Vigorous exercise of short duration. The subject ran up and down a staircase about 15 feet high 10 times in 118 to 150 seconds. (2) Walking for a varying period at 3-4 miles an hour during the hottest hours. (3) The subject was put in a small chamber of galvanised iron exposed to the sun's rays, water being boiled within to produce additional moist heat.

The results are shown in a series of tables, and in one instance in charts. The summary is as follows —

1 Vigorous exercise of short duration caused —

(a) An increase in the pulse rate and blood pressure, both of which rapidly fell to normal after discontinuation of the exercise.

(b) An increase in the carbon dioxide percentage of the alveolar air.
 2 The alveolar air at rest in inhabitants of tropical Queensland showed a lower carbon dioxide content than the European average.

3 Prolonged exercise led to a rapid increase in the pulse rate and temperature at first, which increase became more gradual afterwards, and in the case of blood pressure even fell on occasions below normal, on account of the profuse sweating. Prolonged exercise had but little effect on the alveolar air. The body temperature during the exercise continued to rise slowly but, considering the light nature of the exercise, the rise in temperature was considerable [exceeding in 3 instances 103° F].

4 A considerable loss of water from the body was observed as the result of prolonged exercise [on several occasions 2 to 3 kilos]. Blood estimations showed that this water was mainly derived from other sources in the organism than the blood plasma, a small concentration of the blood plasma, however, had taken place.

5 The hot room experiments gave results similar to those caused by prolonged exercise, with this difference, that the pulse rate and body temperature rose more gradually at first, but a quicker rise took place afterwards.

6 The results point to the fact that both exercise and humid heat play a part in producing a rise in blood pressure, pulse rate, and rectal temperature. The degree of rise, however, is controlled by atmospheric conditions which influence the rate of cooling of the body."

GOFFERJÉ (Fritz) **Die Volksgesundheit in den deutschen Siedelungen von Santa Catharina** [Hygiene of the German Settlements in Santa Catharina]—*Arch f Schiffs- u Trop-Hyg* 1919 Dec Vol 23 No 20 & 21 pp 498-513

An interesting account of the German settlers in the lowlands of Santa Catharina, Brazil, a strip of country 50-100 kilometres wide, lying between the mountains and the Atlantic. Though it is not within the tropics it has a hot and damp climate. The mean temperatures are for the hot months 25°C (77°F) and the cool months 16°. The rainfall is 2000 mm (78 inches), rain falls throughout the year but chiefly in the cooler months. Along the coast are wide salt lagoons and large swamps extend into the interior. The rivers from time to time flood the country. Here live 85,000 people of German race, forming one fifth of the total population. The greater number have been there for two or three generations. They do their own work as farmers or artisans. The author thinks that the state of their hygiene should help to answer the question how far Germans are adapted to warm countries.

One circumstance has tended to the protection of the settlers from such diseases as typhoid, dysentery, diphtheria, scarlet fever, measles, small-pox, influenza. The settlements are isolated, each family lives on its own land, and there is little personal intercourse. After some remarks on the history of malaria in the country the author says that there is much less than formerly and that on the whole it is on the decline. A more formidable problem, described as the scourge of the colonists, is ankylostomiasis, or "maldeter" (*mal de terra*) as it is called. Its victims become unfit for work, suffer from will paralysis, and readily succumb to other diseases, while the children are stunted in their development. For a long time the nature of the disease was not recognised. All preventive measures have so far failed. The settlers do not wear boots, except on holidays, they dislike them and the cost is too great for their general adoption. They have yet to be educated to the use of either pit or pail latrines. The disease is absent from the towns, where there is a pail system, and there is a great difference in the appearance of town and country people. Tuberculosis is uncommon. Venereal disease is rare but becoming less so.

The health conditions of the natives are less favourable than those of the settlers. They are the result of intermarriage between the Portuguese and native Indians in the last 400 years, African elements are uncommon. They are an honest friendly folk and on good terms with the settlers. The absence of friction is probably partly due to the fact that they are not servants. Both malaria and ankylostomiasis are severe amongst them so that it is doubtful which is the more pressing problem. The native takes no step to get rid of malaria as the settler has done by clearing and house building, he does not even leave malarious localities, in fact he is chiefly found along the coast in swampy hollows and near the water courses. He deposits his excreta promiscuously round his house, where they are scattered by scratching hens and rain showers. The lethargic temperament of these people is probably largely due to ankylostomiasis. Tuberculosis is rife amongst them, and is encouraged by the character of their houses and the under-nourishment from which they suffer, it is more prevalent in country than in town where a more varied diet can be obtained.

The disease when it occurs is severe and progressive, and usually attacks the lungs. Tuberculosis of bone and skin is rare. The infantile mortality is high, which the author attributes to the fact that the mother does not suckle the child for more than a few weeks, after which it is fed on meal and banana pap, another cause given is malaria.

The settlers are all vaccinated against small-pox, which occurs in the form of milk-pox or alastrim. The natives from fear and superstition resist vaccination, here and elsewhere in Brazil. A mortality table for 21 years (1890-1910) is given for Rio de Janeiro showing the deaths from 6 diseases for each year. While yellow fever disappeared after 1908, plague in 1910 had diminished to 3 cases, typhoid to 5, and malaria to 28 per 100,000, the 1908 figure for small-pox was the largest on record—1027—and tuberculosis stands at about the same figure as 20 years earlier, i.e., 459. The Santa Catharina settlements are protected from most of these diseases by their isolation from trade routes. Yellow fever has been introduced but cannot maintain itself. [There is no mention of *Stegomyia fasciata*.]

Leprosy is found in the interior, but not apparently between the mountains and the sea unless introduced. Lung inflammation, joint rheumatism, rickets, appendicitis are, it is stated, rare. With regard to rickets the absence of pelvic contraction in the women is notable. The only important condition which can be laid to the charge of the climate is neurasthenia, preceded by slackness and anaemia. It is a disease of the poor, and especially the hard working. The first ten years in the colony is a constant struggle with nature, on poor food, without intermission in all weathers. The author goes on to comment on the lack of cleanliness of the settlers, in which they are behind the black men in the country, he seems to consider this as a contributory cause of the nerve condition. [Ankylostomiasis would seem to be a more likely factor.] Spirituous drinks are little taken.

The birth rate among the settlers is high, well between 40 and 60 per mille. Children there are a form of wealth and cheap to keep. As was stated above the infantile mortality is low, so that the increase of population is rapid. Hitherto the settlements have remained like "foreign bodies" in Brazil. There has been little intercourse with the surrounding country and insufficient knowledge of its language. Railway development is likely to change this, and mixed marriages are becoming more common.

A G B

MATHIEU (L.) Gibraltar. Histoire médicale Conditions hygiéniques actuelles.—*Arch Méd et Pharm Nav* 1919 Sept Vol 108 No 3 pp 208-221

An interesting account of the medical history of Gibraltar, from 1349 when the Castilian army besieging the Moors, who were then in occupation, was attacked by bubonic plague, down to modern times. In 1649 in the course of the Spanish occupation there was a similar epidemic, when the inhabitants who withdrew to the neighbouring hill, San Roque, were spared. In 1780 the English garrison was attacked by scurvy, the Spaniards had completely interrupted the traffic of fresh viands from Tangier. Fortunately a dogger loaded with oranges and lemons was seized and the fruit distributed—with very rapid effects, so that men considered incurable were able to leave their beds.

Between 1798 and 1828 yellow fever was a scourge. In 1804 of 16,000 souls 5,500 at least died. On several occasions epidemics of yellow fever among the garrison ceased when it was moved to the Neutral Zone, and only men who went into the town at night were attacked and in 1828 it was noted that ships in the roads with 2,500 sailors or refugees on board were exempt, in spite of communication with the town and the reception on board of convalescents. In this year there were 1,677 deaths from yellow fever. The disease has not appeared since. In 1865 cholera killed 500 persons in three months.

The climatic conditions are described. Owing to lack of space the town is crowded, and tuberculosis accounts for one tenth of the total deaths. An account of the water supply is given. In 1867 was instituted a Board of Sanitary Commissioners. The mortality, which in 1867 was 2·6 per mille, in the last ten years has averaged 15·8. The account ends with a description of the hospitals. A G B

ESQUIER (A) *Quatorze mois dans l'île de Thasos. Notes et souvenirs médicaux*—*Arch Med et Pharm Nav* 1919 May June Vol 107 No 5 6 pp 321-333 pp 401-415 July Vol 108 No 1 pp 31-42

The author gives his experiences, general and professional, of the island of Thasos where, as he notes, HIPPOCRATES made a long and attentive stay in the 5th century B C. Now, as then, malaria flourishes unchecked, though there are places both on the western heights and on the southern coast that have the reputation of being safe. All three forms of the parasite exist but the quartan is rare. Staff-Surgeon SPALDING, R N, told the author that the damp olive-groves at the highly malarious station of Casariti formed a most formidable shelter for *Anopheles*. One case of haemoglobinuric fever occurred during the French occupation, and the author heard of four others. Fevers of the typhoid genus are very common, but are not of a severe type. *Phlebotomus papatasi* and phlebotomus fever were diagnosed. Small pox during the French occupation was kept at arm's length by vaccination, and by other sanitary precautions. Pulmonary tuberculosis was very common among the refugees from the war-stricken mainland, several cases, including some in an advanced stage, appeared to recover under treatment and good feeding. Leprosy, which was not noticed by Hippocrates, was observed in all parts of the island, the anaesthetic and mutilating form being predominant, in few places are the lepers under any sort of control and nowhere are they under proper surveillance. A A

JAMAICA 1 *Six-Monthly Report on the Work carried out in the Government Bacteriological Laboratory April 1st 1918-September 30th 1918 Kingston, Jamaica, B.W.I.*—[H Harold Scott, Government Bacteriologist] [MS]

ii *Six-Monthly Report on the Work carried out in the Government Bacteriological Laboratory. October 1918-March 1919 Kingston, Jamaica, B.W.I.*—[H Harold Scott, Government Bacteriologist] [MS]

1 This report was submitted for the information of the Tropical Diseases Research Fund. For financial reasons, it would appear, the

admirable reports from this Laboratory are not getting the publicity of print Dr Scott reports that 9,131 specimens were dealt with in the 6 months, though he was without an Assistant Bacteriologist. A table shows that more than half of these were examinations of faeces for hookworm in connection with the work of the International Health Board. Of 761 specimens of blood from suspected typhoids 372 gave a positive result. In Kingston and its suburbs there were 167 positives, no great reduction is expected till the town has an adequate water-carriage sewerage system. Meantime a triple vaccine prepared at the laboratory is in use. Three tables show the prevalence of ankylostome and other verminous infections, on which Dr CONNOR of the International Health Board will report in full.

The research work section deals with ackee poisoning and gas gangrene. As a rule the main ackee seasons end with March. In the 6 months under review the trees continued bearing and a later crop of cases of ackee poisoning was consequently expected. Indeed over 30 cases occurred after March 31st. "In no case exhibiting the typical symptoms during life and the characteristic changes in the tissues when examined microscopically has ackee been excluded and furthermore no other cause has been discovered." There can be no manner of doubt that vomiting sickness and ackee poisoning are synonymous. Dr Scott estimates that since 1886 there have been 5,000 deaths from ackee poisoning and that in the season under discussion 250-300 lives have been saved. He does not anticipate that the careless and indiscriminate use of the ackee as food will be eradicated in the life of the present generation but puts his trust in the efforts of schoolmasters and teachers to instruct the children.

Citations are made from the paper of CONNALL and RALSTON on experiments with the ackee (*Blighia sapida*) in West Africa [see this *Bulletin*, Vol 12, p 438]. A description is given of 35 cases which occurred after March 31st and the main facts are given in tabular form. The eating of ackees was usually denied by the patient or the parents, often with violence. Dr Scott writes—"I found that when the parents began to curse and to swear that they know not the ackee, one had rarely to look further than the kitchen of the hut and the stomach of the child lying dead for confirmation of my suspicions of the recent employment of the ackee as food." A case is recorded in which one member of a family ate ackees and salt-fish and two others potatoes boiled separately, all had attacks of vomiting of various degree. It was ascertained that the water used for boiling the ackees had afterwards served for boiling the potatoes, "the poison partly or wholly removed by the boiling with water was absorbed by the potatoes which were subsequently boiled in the same water."

To the suggestion that the disease might be stamped out by cutting down the trees Dr Scott brings the following, among other objections.

(1) It would be a "Herculean" undertaking and would meet with much opposition because the natives rely on the ackees not only for food but to pay their taxes.

(2) In one district in the ackee season it is almost the only cheap food procurable.

- (3) The trees spring up rapidly again if not literally eradicated
- (4) With proper precautions the fruit can be eaten with impunity
- (5) The plant may become of medicinal value when the active principle has been isolated

The case of gas gangrene was in a native women run over by a dray It is discussed in relation to the war work on this subject

ii During this period Dr Scott had a severe attack of enteric fever with two relapses and later influenza became epidemic, so that the Laboratory was closed for some weeks Of 160 positive Widal's 147 gave a reaction with *B typhosus*, 9 with *B paratyphosus A* and 4 with both organisms A case of leukaemia is described, interesting points of which were the age of the patient (12), the rapidity of the course (4 months), absence of splenic enlargement (spleen, 2½ oz), absence of haemorrhages and of poikilocytosis, there was transitory oedema and termination in opisthotonus A considerable portion of the report is on cases of mixed infection with enteric fever and malaria Eleven cases are described with charts [See above, page 252] Apropos of one, Scott states that in his own case in spite of repeated blood examinations it was not till the onset of the 2nd relapse and the 48th day of illness that a positive agglutination of *B typhosus* was obtained

The tables of Helminth infection show an increase of infection of 25 per cent which, the author writes, bodes ill for the island's labour question

Eighty-one sputa contained tubercle bacilli and the author remarks that there is much more tuberculosis than one would expect in so good a climate

A summary is given of 50 cases of ackee poisoning Of the 43 subjects whose ages were known 34 were under the age of 15, i.e., 80.9 per cent

A G B

BOMBAY Report of the Bombay Bacteriological Laboratory for the Year 1917. [W Glen LISTON, Director] 3 pp 1918 Bombay, Government Central Press [Price 2a or 2d]

The work of the laboratory relating to plague will be noticed elsewhere

Work of the Bombay Bacteriological Laboratory.—Dr SOPARKAR made enquiries in relation to schistosomiasis with a view to determine whether the return of troops from Egypt and other parts in Africa would entail risk of the introduction of that disease to India Planorbis is found to occur in large numbers in India but specimens obtained in Bombay differ somewhat from the Egyptian species which conveys *Schistosoma mansoni* Experiments are being made to infect the local Planorbis with miracidia passed by *S mansoni* infected patients The reported absence of *Bullinus* needs confirmation In these investigations 17 types of cercariae were collected from snails, one resembling that of the human schistosome was found to be *S spindalis*

Dr S N GORE has shown that by a simple process of dilution, using a platinum loop and saline solution, he can obtain isolated colonies of typhoid and allied organisms on ordinary agar slopes in test tubes planted with suitable dilutions of an emulsion of faeces.

Moreover it is possible to distinguish colonies of typhoid, etc., from the normal intestinal flora. Not fewer than 50 isolated colonies are examined from a single specimen. The use of this technique will allow all cases of typhoid and allied fevers to be examined bacteriologically before they resume their normal occupations.

Data are given of the examination of pathological fluids and discharges, of the vaccines turned out at the Laboratory, of the classification of morbid tissues sent for report, of the examination of brains for rabies, and of the poisonous snakes received.

A G B

SHILLONG The Second Annual Report of the King Edward VII Memorial Pasteur Institute, for the Year ending 31st December 1918 [KNOWLFS (R.)] 42 pp 1919 Shillong Assam Secretariat Printing Office [Price 12 annas, 1s]

The first annual report of this Institute was noticed in this *Bulletin*, Vol 14, p 245

Pasteur Institute Section—The number of persons who underwent the complete course of treatment was, Europeans 90, Indians 978, total 1,068. The failure rate worked out at 0.56 per cent, no death occurred among the Europeans. A table classifying the patients according to the districts from which they came shows that 587 came from Bengal as against 467 from Assam, and that Calcutta sends more patients than any other district. Whereas at Coonoor jackal bites account for but few cases, at Shillong no less than 225 of the Indian patients had been bitten by jackals, jackal-bite is twice as fatal as dog-bite. The question is often asked, What is the hydrophobia rate among the untreated? And it is difficult to answer for dog-bitten cases because in a few instances the dog was probably not rabid. In the case of jackals the evidence is that the animal is always almost certainly rabid, so that a study of the deaths among untreated jackal-bitten persons would not only yield reliable figures, but also assess the value of treatment. The cases were followed up as before by post-cards and only 8 per cent were untraceable, it is regarded as practically certain that none of these died of hydrophobia. Sixteen statistical tables give varied information about the persons treated.

Bacteriological and Research Section—The total number of specimens examined was double that of the previous year, and Captain Knowles states that research was much impeded by the routine work.

After some remarks about whooping cough, which is always prevalent in the Khasi and Jaintia Hills, the author turns to enteric fever for which a triple vaccine was made, "on some occasions whole villages voluntarily visited the Institute for inoculation and returned for the second dose." Enteric is endemic in the Khasi and Jaintia Hills. Intravenous quinine was used for malaria throughout the year with admirable results. Fourteen patients were treated by intramuscular injections of cinchonine dihydrochloride, 5 to 7 grs daily, but it was found inferior to intravenous quinine. There were sporadic cases of cerebro-spinal fever and a meningococcus vaccine was made but only one report on its use could be obtained. The use of sodium morrhuate in tuberculosis was tried in 12 cases, at first hypodermically

then intravenously in doses up to 2 cc of a 3 per cent emulsion. It is regarded as "probably the best line of treatment now available for tuberculosis in general," especially phthisis. The weight increases and the temperature is often persistently normal.

Bacillary dysentery is prevalent in the province. Two well known Indian remedies against dysentery were tested against Shiga and Flexner strains. A decoction of bela (not bael) leaves was found to exert a definite destructive effect on both strains. A case of "chronic amoebic dysentery" is recorded in which six attempts to find a bacillary cause failed, but the only type of amoeba found in six months was "a large entamoeba, with blunt pseudopodia thrown out *en masse*, clear glassy ectoplasm, clearly visible nucleus, and low phagocytic powers, i.e., *E. coli*". The stools were repeatedly examined but no other type of amoeba found. Binucleate and 8 nucleate cysts were present, but tetranucleate cysts were not seen, and no chromidial rods found."

Diphtheria is endemic in Gauhati and Shillong. In 1918 there was an outbreak at a girls' school in Shillong. Figures are given of the incidence of Hofmann's bacillus, which was present in 30 per cent of clinical cases of diphtheria, 11 per cent of carriers of the Klebs-Loeffler bacillus, and 0.4 per cent of healthy throats. Of 103 anti-rabic patients only 5 per cent shewed it.

"This curious parallelism between diphtheria and the incidence of the bacillus of Hofmann seems more than accidental. It is entirely different to the findings for European and American outbreaks where Hofmann is found in from 20 to 40 per cent of all throats. Whilst the two germs are entirely different as regards morphology, cultural reactions and pathogenicity to animals, the view suggests itself that there may be a symbiotic relationship between them, that diphtheria may develop more readily in the throat of a person already infected with the B of Hofmann, that, *pari passu*, infection with the B of Hofmann may be more permanent and persistent in the throat of a diphtheria convalescent, or carrier. The very fact that the Hofmann incidence is so very different in India from its frequency in Europe and America may be associated with the fact that diphtheria in India is rare, sporadic and does not spread, whereas in Europe and America it tends to assume epidemic proportions."

During the year 22 kala azar patients were treated with intravenous injections of tartar emetic, 16 returned home cured and 6 died either of dysentery or influenza. Details of 20 cases are given in a table. Leishmania is rarely found in the peripheral blood in Assam, whereas it is present in 90 per cent of Madras cases. In the two years it was detected, under optimum conditions, in 9 out of 43 cases, or 21 per cent. A study was made of the hookworm as the possible transmitting agent of the kala azar parasite, with negative results though six months were given to the investigation. A curious phenomenon was that as the cure proceeded and weeks after the hookworms had been banished by dosage with *Oleum chenopodii* the eosinophilia increased, in some cases to 30 and 40 per cent. The questions are raised whether it is "a protective reaction for the encapsuling and destruction of dead parasites and parasite-containing tissue," or a reaction to antimony. In a series of experiments with cultures of the flagellate stage of the parasite human serum, from patients or non-patients, immobilised and destroyed the flagellates. This is taken to mean that this form is not infective to man. Repeated attempts were made to infect

animals with cultures, with negative results. Films of peripheral blood taken from patients at 11 p.m. were searched, the slides were all negative. It is pointed out that the Shillong Institute offers the best possible centre for work on this disease—if the necessary leisure were available. Two subsidiary problems which should be attacked forthwith are to find a serological method of diagnosis and a flagellate vaccine as a possible preventive.

The Section on influenza must be passed over. A vaccine was made on empirical lines and was in enormous demand, it is believed to have produced a temporary immunity to serious complications but figures are not yet available. [This is a most interesting report. The Inspector General of Civil Hospitals, Assam, who submits it, draws attention to the large amount of work performed with a small staff.]

A G B

COMMONWEALTH OF AUSTRALIA The Australian Institute of Tropical Medicine, Townsville, Queensland Half-Yearly Reports from 1st January to 30th June, 1918, and from 1st July to 31st December, 1918 [A BREINL, Director]—15 pp. 1919. Victoria: Albert J. Mullett, Government Printer.

During the summer months the staff of the Institute continued investigations into the physiological activities of the white race living in North Queensland. The effect of exercise on the human organism under the influence of high humidity under natural conditions was studied. The observations were made on six subjects after short turns of vigorous exercise, after prolonged exercise and by exposure of two to extreme heat. The blood pressure, pulse rate, and body temperature (rectal) were taken before and after the exercise, and samples of alveolar air were collected for estimation of the carbonic acid. The experiments and their several results are described. The outstanding result is that the high temperature and humidity interfere with the cooling mechanism—the evaporation of sweat. The conclusion is drawn that it is impossible to continue heavy manual labour under true tropical conditions for the same time as in a temperate region, without raising the body temperature to a degree of danger and upsetting entirely the mechanism of the metabolism.

In the second half year a malarial survey of the Innisfail District was carried out. Many patients have been under treatment for malaria at the Townsville Hospital who came from a part of the district, Mourilyan Harbour, and malaria was supposed to be prevalent in other parts of it. A house to house visit was made and bloodsmears taken from persons who had or had had fever especially children. In the Mourilyan Harbour district a few smears contained malarial parasites and here *Anopheles annulipes* was found breeding in large numbers. Patients however were seen with temperature 104°, no physical signs, and with no malarial parasites in the blood. This fever has as a rule a week's duration, it is said to recur yearly. Two cases were studied in the Innisfail hospital. The fever resolved by lysis and the patients were left weak and debilitated. No parasites could be found in the blood, nor any characteristic changes in the white cell count. Hence "a fever of unknown origin has given in the past the whole of the Innisfail District the evil reputation of being a

malarial infected district" Endemic glandular fever was also seen All the Townsville school children were examined for hookworm, by the use of the same technique as the staff of the Rockefeller Foundation, of 2,420 stools 183 were positive, or 7.5 per cent, but out of 6 schools and an orphanage, one school and the orphanage were heavily infected, 561 children showing 127 infections

A list of the tropical diseases treated at the hospital include 26 cases of "febricula"

Dr W J YOUNG, the Biochemist, makes two short reports on the work of his department

Dr J J HARRIS, the Bacteriologist, appointed in place of Dr PRIESTLY, from a series of examinations determined that the brilliant green eosin medium was the best of four tried for the isolation of *B. typhosus* from faeces A detailed and apparently exhaustive examination was made of the faeces of four members of the staff of the Institute who had been resident for five years or more to find to what degree the tropical faecal flora differed from the temperate For this the report must be consulted The work was done on the lines of the investigations of MACNEAL LATZER and KERR (1908)

Dr F H TAYLOR, the Entomologist, gives a list of mosquitoes found in the Innisfail District He resigned his position in September

A G B

SERGEANT (Edmond) Rapport sur le fonctionnement de l'Institut Pasteur d'Algérie en 1918—*Arch Inst Pasteur de Tunis* 1919 June Vol 11 No 1 pp 61-73

A table of microbiological analyses shows the extent of the work during the year under review The chief among these were examinations of rats for plague, serodiagnosis of syphilis, enteric and undulant fever, and microscopic examinations for tuberculosis, diphtheria and malaria There were treated in the anti-rabies department 1,762 persons with a mortality rate of 0.05 per cent, of these 178 came from Morocco Anti-malarial measures were carried out as in previous years The Institute delivered in this year 2,718,741 doses of serums, vaccines, and other biological products Of these 2,113,070 were anti-smallpox vaccine, anti-enteric vaccine coming next on the list, which shows that 25 kinds of vaccine or serum are here manufactured for human as apart from veterinary use Of powder of maritime squill for use against rats 4,120 doses were prepared The anti-malarial mission to the Army of North Africa and the Army of the East in Macedonia continued to do valuable work in the latter there were only one-third of the admissions to hospital in 1917 An account is given of the publications put out during the year These have already been noticed either in this or the *Tropical Veterinary Bulletin*

A G B

COONOR The Pasteur Institute of Southern India. The Annual Report of the Director together with the Twelfth Annual Report of the Central Committee of the Association. [CORNWALL (J W)] —25 pp 1919 Madras Superintendent, Government Press

This Report consists chiefly of tables, which give much information that obviously cannot be summarised 2,975 persons were treated

with a corrected death rate of 0.74 per cent. The following table, the result of a special enquiry in progress for six years, indicates "the proportion of the persons bitten that may be fatally infected by the bite of a rabid animal." At least one of the persons bitten by the same animal succumbed to hydrophobia. It does not bear on the efficiency of treatment because none of the patients came until 40 or more days had elapsed since the bite so they probably would have escaped anyhow.

"Numbers of persons bitten	248
Number treated	74
Deaths among the treated	Nil
Number untreated	174
Deaths among the untreated	84
Percentage mortality on total number bitten	33.9"

Statistics covering 11 years show that in 96.6 per cent of cases admitted the biting animal was a dog. [Cf Shillong Report, above].

A G B

RIVAS (D) *Tropical Resources and Hygiene*—*New Orleans Med & Surg JI* 1919 Sept Vol 72 No 3 pp 145-151

The author's theme is the vastness of the natural resources of the inter-tropical regions and the inability, till recently, to exploit them owing to ignorance of the causes and modes of transmission of the diseases of the tropics. He believes that the Latin-Americans having inherited immunity on the one side to tuberculosis and other European diseases and on the other to malaria and tropical diseases, are well-fitted to withstand unfavourable climatic and sanitary conditions, and that this fact will aid greatly in the sanitation of tropical and sub-tropical America.

A G B

TODD (John L.) *Canadian Doctors and Uncanadian Diseases*—*Canadian Med Assoc JI* 1919 Aug Vol 9 No 8 pp 709-716

Professor Todd's thesis is that the Canadian doctor must familiarize himself with the diseases of the tropics, both on account of their diffusion through rapid transportation and for the light they shed on daily problems of pathology in Canada. "As a rule a practitioner in the tropics knows more of the cause, process, prevention and cure of the diseases with which he deals than does his confrère who works in a Canadian hospital", such a man is "impatient of unexplaining empiricism" and refuses "to be blind to unsatisfactory practice even though it be established by custom." The paper is an admirable one and is cast in a literary form that is too rarely met with in medical periodicals.

A G B

BASS (C C) *Some Phases of Tropical Medicine in the Recent World Conflict*.—*New Orleans Med & Surg JI* 1919 Aug Vol 72 No 2 pp 72-81

The burden of this article, the Presidential address at the 15th Annual Meeting of the American Society of Tropical Medicine, 1919, is the great loss of life and efficiency due to tropical diseases which

were largely preventable, more especially among British and French troops but also in training camps in the U S A "During the present war there has been great neglect of some of the things we have known about tropical diseases for many years Those who have been engaged in the investigation of tropical and preventable diseases have not commanded sufficient recognition for their opinions"

A G B

Proceedings of the Medical Conference held at the Invitation of the Committee of Red Cross Societies Cannes, France, April 1 to 11, 1919—179 pp With illustrations Geneva, Switzerland The League of Red Cross Societies

The Conference was attended by delegates from France, Gt Britain, Italy, Japan and the United States Meetings were held at which memoranda and various problems and plans of action suggested for new work for the Red Cross Societies were discussed Seven Sections were formed, to discuss action in regard to Venereal Disease, Child Welfare, Tuberculosis, Malaria, Nursing, Preventive Medicine, and Publication, Education and Statistics The Section in which readers of this *Bulletin* are particularly interested is malaria, a Report on which was adopted and presented to the Conference The following general recommendations were made

"A Immediate Work

"1 That a Central Malaria Bureau or Section should be inaugurated as soon as possible as a part of any general organized scheme for work in this field

"2 That this Central Bureau or Section should seek through the National Red Cross Societies to enter into co operative relations with national agencies for the control of malaria

"3 That it should keep in touch with the progress in malaria control in all countries, and make use of the achievements of each for the stimulation and guidance of all

"4 As opportunity offers and means are available, it should co operate with existing agencies in active measures for malaria control

B Information, Propaganda, and Demonstration

"1 That a comprehensive study of the literature and of the geographical distribution of the disease be made with a view to assembling the essential facts under the following heads —

- (a) The regions which are suffering from the prevalence of malaria
- (b) The degree of infection or amount of malaria in the infected areas
- (c) The significance of malaria as a disabling disease (by countries)
- (d) The measures which have been shown by demonstration to be effective in malaria control

"2 That a series of telling demonstrations in the control of malaria be made, when practicable, giving in each case the local conditions which had to be met, the control measures adopted, the details of operation, the results accomplished, and the *per capita* cost

"3 That the information thus collected be prepared in the form of a brief, clear, forceful narrative, abundantly illustrated with maps, charts, graphs and photographs

"4 That this information be given the widest distribution in the countries concerned"

The chairman of the Section was Dr LAYMAN and the British members were Sir Ronald Ross and Col S Lyle CUMMINS

A G B

HINTZE (K) *Welchen Einfluss hat das Tropenklima auf Angehörige der weissen Rasse?*—[The Influence of Tropical Climate on the White Race]—*Arch f Schiffs- u Trop-Hyg* 1916 Feb-March Vol 20 Nos 4, 5, 6 pp 91-104, 122-138, 148-172 [Received Dec 1919]

At the outset of this long paper [the first part was only received in December 1919], in which acclimatisation in its theoretical as well as practical aspects is fully discussed, the author defines what he means by climate and expressly states that all changes produced by disease, even if favoured by climatic conditions, are excluded. Only the later section, in which he deals with the practical side, is here considered. He speaks from 15 years' experience in various parts of the tropics.

He combats the notion that the European cannot do manual work in the tropics, pointing to the vigour with which the British play tennis and football, or hunt, doing strenuous work for which they feel all the better, and asks why the white peasant should not follow the plough in the tropics so long as he is not driven. The men who fail to keep the health and vigour in the tropics are those who either will not give up the mode of living to which they are accustomed in Europe, or are resourceless people who become homesick. Women too stand the climate well, he knows of no evidence that the climacteric tries them, as CASTELLANI asserts, and points to the fact that the poorer women who have to perform hand work are much healthier than their more fortunate sisters for whom everything is done. Children flourish exceedingly, perhaps they grow too fast, but he sees no reason for sending them to Europe except for the educational advantages and having regard to the risk of sexual precocity in the tropics. A different impression of the effect of climate prevails because the results of endemic diseases have not been differentiated from those of climate. In countries long settled, such as Java and India [probably the Dutch Indies are meant], one meets with people who have been there 30 or 40 years, enjoying good bodily and mental health, and have no intention of ever leaving.

With regard to the second generation he refers to North Queensland where, as described by MACDONALD, there is a healthy hard-working race of white men enjoying excellent health and some of them in the third generation. The history of Barbados is then given, first settled in 1625 and having a white population of 20,000 in 1650 according to WATTS there are now many native whites who are quite healthy and capable of work, here there is no malaria. A better case is that of the small Dutch island of Saba, one of the Lesser Antilles which was settled by white men in 1640. In 1911 the population was 2,387. The purity of the race has never been contested. The people are mainly farmers and sailors. The women are said to be the handsomest in the West Indies and are distinguished by their slenderness and healthy appearance. There are said to be signs of degeneration—insanity and idiocy—in one village but this is attributed to inbreeding by the local pastor who bears testimony to the intelligence and healthiness of the inhabitants generally. The conditions are similar in the Island of St Martin with its 3,385 inhabitants. In Curaçao are white families which have been settled there for many generations as traders and planters, from that island also come tales of mental degeneration.

The only experiment of systematic colonising by the Dutch is that of Surinam (Dutch Guiana). In 1845 384 persons sailed thither from Holland to form a Colony on the Saramacca river. Many died of a fever and some returned, but in 1855 73 remained and by 1895 there were 220 survivors 153 of whom had been born in the country. The second generation was not so strongly built as their forbears, but well able to maintain themselves by manual labour. In the third generation there were said to be signs of degeneration. In the Dutch East Indies it is only in the Banda Islands and on Kisser* that a pure race is found. The author is acquainted with the former but is not aware of any long established pure-bred families. In Spanish and Portuguese America scarcely a pure-bred family can be found.

He goes on to describe the German colonisation of Espirito Santo, Brazil, on the coast at 20° S. In 1847, 38 Rhemish families settled here and in 1857 were reinforced by about 1,000 Germans, Dutch, Swiss, Tyrolese and Luxemburgers and in the 60's and 70's there were other additions. The pioneers had a severe struggle with nature and with disease. Now 5,000 square kilos have been settled, and the colony consists of 8 communities of, in all, 17,000-18,000 souls. It is in a flourishing condition. The birth-rate in various parts is between 48 and 70 per mille, and the death-rate 8-14, according to WAGEMANN. The settlers have not intermarried with the natives, whom they despise.

Commenting on these various efforts the author says that they illustrate one thing—how not to do it. In one case unselected people were set down in a swampy uncultivated valley, the home of various tropical diseases, and left to fend for themselves, in another a few persons were put on a distant small island where inbreeding was unavoidable. With the present knowledge of tropical pathology these experiments would be made in a very different way. The history of the cutting of the Panama Canal is instanced. Before a new colony is started the endemic tropical diseases must be studied and the sources of water supply, whether sufficient food is procurable and the nature of the houses that can be erected. Heights of 1,000-3,000 feet should be settled before the lowlands, later generations can settle the coast. The settlers must have good bodily and mental health and be about 25 years of age. For the cultivation of the land people should be selected who are accustomed to such work and they should be sent out preferably in summer. They should drive machines rather than do the work with their own muscles. All the preliminary work should be done by mechanical means which are even more essential.

* The following note is extracted from the *Journal of Tropical Medicine and Hygiene* 1915 Vol 18 p 12

"An interesting experiment is narrated by Mr J Macmillan BROWN in "The Dutch East" (Kegan Paul & Co 1914)

"In 1665, eight Dutch soldiers and their wives were left at the Island of Kissa (Kissar), 16 miles to the east of the Island of Timor, about 8° S latitude, considerably nearer the Equator than the most northern point of Australia. Here descendants of these eight couples, 300 in number, still remain—a sturdy race with no sign of any ill effects from inbreeding. They still keep their blood pure, with fair European complexions, light hair and blue eyes." The same author writes elsewhere—"The main cause of their vitality and vigour I take to be their dry and barren islet (which is only six miles long and yet supports 8,000 people) compelling them to work if they are to live."

in the tropics than at home. In the selection of mechanics and the like the dwellers in big towns should be passed over, as being too much wedded to urban habits. To open up new countries the settlers must be men of independent character as well as hard workers.

The author goes on to say that new comers to the tropics should accustom themselves gradually to the brighter light in order to augment the skin pigmentation which he regards as essential to withstand the damaging action of the short-waved rays. He notes that natives who have lost much pigment (albinism, leucoderma, etc.) suffer severely from the loss and are unable to work in the fields. In this connexion he reminds us that cows with pale udders may not be imported to the Argentine because they fail to do well there. He mentions also the black pigs of Virginia, and the buck wheat disease of pigs and sheep.

Marriage should be delayed till the woman is sufficiently acclimatised by, say, a year's residence. The author criticises the usual custom by which the man comes home on leave and takes out his wife soon after the wedding, a child is born perhaps a few months after arrival in the colony. Whether the degeneration in the third and fourth generation is due to the influence of heat and light or to inbreeding, needs, he thinks, careful investigation.

A list of references, mostly German, occupies nearly four pages.

A G B

BREINL (A) & YOUNG (W J) **Tropical Australia and its Settlement** — *Med Jl Australia* 1919 May 3, 10, and 17 Nos 18, 19, and 20 pp 353-359 With 5 figs, 375-382, 395-403 With 6 figs

This long paper consists of sections on the climate of Northern Australia, on the effects of tropical sunlight and of heat and humidity on the animal organism, and on white settlement in Tropical Australia. The authors do not limit themselves to the climatic conditions and their effect on the white man, but discuss also the economic aspect of the settlement of Tropical Australia.

The Climate of Northern Australia—They write "To describe climate from the point of view of its effects upon a human race is impossible with our present means." Some of the attempts are recounted the wet bulb readings of HALDANE and others, the katathermometer of Leonard HILL, the dew point of BRUCE, none of these gives information in regard to personal comfort. The authors reproduce graphs which give for 17 towns in Tropical Australia the average monthly dry and wet bulb temperatures taken at 9.0 a.m. over a period of five years and the average monthly rainfalls. The graphs are disposed on the page in accordance with the geographical position of the towns and demonstrate the difference between inland and coastal climate, the towns of the latter having higher wet and lower dry bulb readings than those of the former. Rainfall appears to vary between 167 inches per annum at Harvey Creek on the north-eastern coast to 22 inches at Broome on the north-western.

Sunlight in the Tropics—Under this head experiments in the Philippines and elsewhere are quoted, with the conclusion that any ill effects due to exposure to sun are due to heat rather than light.

It is regarded as almost impossible to study the physiological action of solar radiation without the inclusion of the heat rays

Effects of Heat and Humidity on the Animal Organism—Various experiments in temperate climates are quoted to show that the main difference between temperature regulation in the tropics and in a temperate climate lies in the greater activity of the sweat glands and consequent increased evaporation. The changes in the physiology of the white man living under tropical conditions are considered under the headings—body temperature in the tropics, rate of respiration, blood pressure, blood conditions, metabolism, effect of tropical climate on the nervous system, clothing. YOUNG'S (1915) observations show that at rest the body temperature in the tropics does not vary from that in a temperate climate, but with exercise the temperature rises more quickly and subsequently decreases more slowly than in a temperate zone, he measured the temperature in the rectum. As to the blood conditions the only definite changes that have been discovered are in the differential leucocyte count and in the Arneth index, the proportion of the polymorphonuclear neutrophil leucocytes is decreased from 65-70 per cent to 56.1-56.8 per cent and there is the phenomenon, of unknown significance, of the "shift to the left"

Metabolism in the tropics is treated at some length with accounts of the experiments of EIJKMAN, RANKE, GLOGNER, SCHILLING and JAFFÉ, McCAY and others. The results of investigations into food values in the tropics "make it clear that in general the requirements in calories, either of white men or coloured natives, do not differ appreciably from European standards" and indicate that "the amount of heat produced by the combustion of food is not any less in the tropics than in a temperate climate and that nature does not have recourse to a reduced metabolism to regulate body temperature," nor have researches into the total metabolism, as determined by the respiratory gas exchange, revealed any changes which might be attributed to the influence of climatic conditions. It has often been pointed out that the dietary of the majority of aboriginal races in the tropics contains a relatively small proportion of protein, but it is probable (McCAY) that this is due only to inability to procure a larger quantity. Examination of the urine in Townsville during the hot months by YOUNG and comparison with the European standard [whether a hot month standard or an average is not stated] shows a reduction by half in Townsville with a large reduction in the total nitrogen and sodium chloride. The decrease in nitrogen indicates a decrease in the amount of protein metabolized but the loss of salt is largely accounted for by loss through the skin.

Under nervous effects "Tropical Neurasthenia" is discussed and is admitted to be a frequent cause of invaliding, but it is doubtful how far the condition is due to climatic influences and how far to the altered conditions and habits of tropical life. The paragraphs on clothing in the tropics only illustrate differences of opinion and the failure of theoretical considerations to assist conclusions.

In the authors' summary of the physiological changes under discussion it is admitted that the review of the "known facts" is from a scientific point of view disappointing, which they attribute to the uncertainty of the value of the temperate climate standards, and to the small scale of the observations and experiments. They think it

possible that a closer study of the functions of the central and peripheral nervous system might reveal definite alterations, which would account for the neurasthenia. Reaction times and responses to different stimuli can be exactly measured, and they recommend extensive investigation into the mental activities of adults as well as of children.

White Settlement in Tropical Australia—This section is of a more practical character. Northern Australia differs from the tropics elsewhere in that, except on the coast, the dry weather lasts for seven months when all vegetation dies down—droughts lasting for years are not uncommon—and in the sparsity of the aboriginal population, since the arrival of Europeans their numbers have decreased. The total population of the tropical portion of Australia, exclusive of aborigines, at the 1911 Census was 165,420, the great majority of whom were in Queensland, and only 3,310 in the Northern Territory, increased to 4,908 in 1917 (one inhabitant to 80 square miles). Of the total population of Queensland 25 per cent live in the tropics, hence if the tropical portion were unhealthy it should show in the vital statistics. This however it does not do. The figures from 1906 to 1917 show a smaller annual mortality for Queensland than for the Commonwealth in every year but two, and in every one of twelve years the infantile mortality of Queensland was below that of the Commonwealth, that is to say, the State having 25 per cent of its population within the tropics and containing some 95 per cent of the tropical population of the Commonwealth, has a record for general and infant mortality much more favourable than that for the Commonwealth as a whole. Moreover a comparison of Queensland with 22 other countries for 1913 shows that the death-rates, infantile as well as general, in Queensland are lowest of all (6.3 and 10.4 respectively).

Interesting information about tropical Queensland is given under housing, the houses seem for the most part quite unsuitable and this is attributed to prejudice on the part of the inhabitants. A plan of a house devised by Mr C. D. LYNCH is given. The remainder of the paper deals with the economic conditions.

A list of 67 references is appended.

A. G. B.

JAMIN. Note sur les cures de Blanchiment pratiquées en Tunisie en 1918.—*Arch. Inst. Pasteur de Tunis* 1919. June. Vol. 11. No. 1. pp. 14-23.

The patients submitted to the treatment described in this paper were 590 Tunisian recruits in whose case it was necessary that they should be cleared* of their syphilitic lesions, active syphilis being a cause of exemption from military service. The patients to undergo the course were selected by the medical officers of the Recruiting Commissions. The Bordet-Wassermann reaction was employed in 78 cases, not in all because it is not an absolute criterion seeing that old syphilis may give a negative reaction though symptoms are present.

* A lame translation of *blanchiment*, which signifies the vigorous treatment which leads to the disappearance or cicatrization of contagious lesions.

It was laid down that the course must be completed in a month, and that it must not interfere with training

Treatment was mercurial, arsenical, and in some instances local Every other day a deep gluteal injection was given of bimodide of mercury amounting to 0.02 gm of the metal for an average of 15 injections The reaction did not hinder training The Arabs being careful of their mouths, no precaution was taken against stonatitis

Every 7 days novarsenobenzol was injected into the veins in successive doses of 0.30, 0.45, 0.60, 0.90 and 0.90 gm It was prepared with sterilised distilled water the total volume not exceeding 2.5 cc The men were fasting and were exempt from duty for 24 hours Of 565 men who completed the course —

524 (92.7 %) were cleared of their lesions (*blanchis*)
 32 (6.6 %) , improved
 9 (1.8 %) , *in statu quo*

In the case of the *blanchis*, in general all active lesions disappeared in 15 days. The 32 "improved" had osteo periosteal lesions, lesions of mucous membranes or visceral lesions More time is needed for these, the normal method of cure being sclerosis The general state of the recruits improved greatly

Classification of the symptoms according to the most prominent in each case gave the following results —

Muco cutaneous lesions	180
Cutaneous "	223
Lesions of mucous membrane	119
" " organs of special sense	35
Osteo periosteal lesions	16
Visceral	7
Hereditary syphilis "	10
	<hr/> 590

Tunisian syphilis in fact belongs to the classical type of so-called "colonial" syphilis with its great predominance of lesions of skin and mucous membrane There was no case of syphilis of the nervous system Among the lesions those of the scrotum were very frequent The lesions of the mucosa were frequently ulcerous, leading to serious impairment of function Non-syphilitic affections noted as frequent were lichen planus of the mouth and marginal circinate glossitis or geographical tongue, which the author seems to think has something to do with magnesium salts in the drinking water The organs of special sense affected were in nearly all cases the naso pharyngeal Osteo-periosteal lesions were found in only 16 out of the 590 The only visceral lesion met with was orchitis

In his conclusions the author points out that in a country like Tunis where the great majority of lesions are of the skin, and mucous membranes, and hence highly contagious, the methodical application of the treatment by *blanchiment* constitutes one of the most active measures against syphilis—prophylaxis by treatment It is absolutely harmless to the native It should in the future be systematically applied so that the disease in recruits may be attenuated as much as possible The attenuation should be maintained by further treatment, say an arsenobenzol or mercurial course once a year, a

centigram of mercury in soluble form should be injected daily for one month, this as a minimum. It is no question of the cure of syphilis but of rendering it inactive, and limiting it to the subject infected by it.

A G B

SUTHERLAND (W D) & MITRA (Gopal Chandra) **The Wassermann Reaction in Syphilis as a Guide to Treatment**—*Indian Med Gaz* 1919 June Vol 54 No 6 pp 201-206

The Imperial Serologist and Assistant Serologist, Calcutta, have collated the results obtained by them in 1,498 cases in which a provisional diagnosis of the condition present had been made before the patient's blood was examined for the Bordet-Wassermann reaction. They note that of 3,800 cases examined at the Calcutta Hospital, 2,358 were positive, or 62 per cent. The materials used for the test and the technique, to which the authors ascribe great importance, are described. Details are given of four instances in which the findings of laboratories differed, an unfortunate occurrence which they consider to be largely due to insufficient care to ensure proper control of all ingredients at the time of test. Notes are given of thirteen instances in which a doubtful diagnosis of syphilis was clinched by a positive reaction and of other cases in which a provocative injection enabled a positive reaction to be obtained.

They have been struck by the number of cases in which the reaction was not easily and favourably affected by treatment because organic arsenic had been pushed to the neglect of mercury, neither given alone "can do half as much as the two combined can accomplish." They prefer mercurialunctions to injections or pills. They give a tabulated and classified list of symptoms occupying three pages, in which, opposite each symptom are shown the result of the Bordet Wassermann test and the presence or absence of the reaction in cases in which there was (1) no history of sore, (2) history of sore, (3) history of gonorrhoea alone, (4) history of gonorrhoea and soft sore, (5) history of bubo alone.

A G B

MONTPELIER (Jean) [Changes in the Cerebrospinal Fluid in Syphilis among the Natives of Algeria]—*Ann des Maladies Veneriennes* 1918 Aug p 449 [Summarised in *Jl Cutaneous Diseases* 1919 Aug Vol 37 No 8 p 567]

The abstract given in the *Journal of Cutaneous Diseases* is as follows:

"Montpelier states that in his experience the theory that cerebrospinal syphilis is rare among Algerians is a fallacy, he found it to be just as frequent as among Europeans. In an analysis of the cerebrospinal fluid in sixty cases of the disease in all its stages, he found that the pathologic changes were most frequent in the secondary period. In some of the cases the changes began even before the mucocutaneous eruptions. His findings were invariably negative in the primary stage. The most frequent change was in the albumin content, and in his opinion this was the beginning of the pathologic process. One of the cases developed a marked albuminosis and lymphocytosis thirty five days after the chancre and twelve days before the papular eruption."

TALBOT L'iritis spécifique chez l'Annamite — *Bull Soc Med-Chiru, Indochine* 1919 June Vol 10 No 1 pp 9-11

The author gives a table of the syphilitic ocular manifestations seen at the Ophthalmological Institute of Indo-China in the years 1916-19. Of 236 patients 112 had iritis, the symptoms coming next in frequency (47 and 46) being interstitial keratitis and optic atrophy.

Whereas in Europe the most common form of specific iritis is the diffuse acute form, and diffuse chronic iritis is rare, in Annam all the 112 cases were chronic except 8 which were acute. Reaction is slight or absent, most patients present themselves for disturbance of vision and made no other complaint. As in Europe this form is grave. There are recurrent attacks of fibrinous inflammation till at last the iris becomes adherent to the lens all round, and the issue is relative or complete blindness. Intensive mercurial injections and a wide iridectomy are indicated and are practised, but generally without success owing to the advanced stage at which the native applies for treatment.

A G B

WILLE (W A) Een leerzaam geval van hemeralopia idiopathica cum xerophthalmia [An Instructive Case of Hemeralopia Idiopathica with Xerophthalmia] — *Geneesk Tijdschr v Nederl-Indie* 1919 Vol 59 No 3 pp 420-439 With 5 figs

The English summary of this paper runs as follows —

"The author reports a case of hemeralopia idiopathica cum xerophthalmia in a young Ambonese man, 16 years of age, sent from an internate for boys in central Java.

"He describes the disease itself as well as the occasionally accompanying keratomalacia, and gives a summary of the history of the disease from 1863, when it was first described by Bitot. During the following decenniums the reports of the disease were mainly coming from the Brazils, where it was ravaging badly in 'epidemics' among the slaves on the plantations.

"In 1883 the xerosis bacillus was discovered, but later on it appeared to be a saprophyte. At that time the disease was considered to be of infectious character. Later on experience has proved through numerous observations in many different places in Europe and Japan, and also in the practice of the author, that xerophthalmia is caused by a deficiency in the nourishment, and that it is rapidly cured by proper milk nutrition (especially of course in babies), by eggs, liver and codliver oil. Sesam oil has proved to be of no effect. Experiments with animals have made it probable, that the following aliments will have a similar curative effect: Codfish testicles, pigs kidneys, ox fat, Indian corn, wheat and rye, but it has hitherto not been proved in practice. Cocos oil, olive oil, cotton oil, almond oil, rice and rice bran will probably be of no effect.

"The author is now returning to his case, which was rapidly cured by means of 2 eggs and 2 tablespoonfuls of codliver oil a day. The remarkable and instructive feature is, that the boy was from a well managed institution. He points out, that the daily allowance contains sufficient caloriums, sufficient quantities of albumen, fat, hydrates of carbon and mineral salts, and sufficient of the aliments that protect against beri beri, but practically none of the substances, that with certainty protect against xerophthalmia, nor of the others which probably have this effect. Formerly eggs had been given, but seeing that they were not always eaten, this supply had been stopped about 3 months ago. Since then, the disease had begun to develop.

"This case shows how thoughtful one must be in making up the prescription for the daily allowance in internates, prisons, etc., here in the Dutch East Indies. The reason is, that while in Europe the bread corn, rye and wheat, and the usual fatty substances, butter and margarine protect against xerophthalmia, has neither the usual corn here in the east, the rice, nor the usual fatty substance, the coco's oil, this effect

According to modern terminology, proposed by FUNK, the xerophthalmia is an avitaminosis (a), in that way forming an interesting analogy to bern berry, which is an avitaminosis (b) "

A G B

JOUVEAU-DUBREUIL (H) 1 Meningite cérébro-spinale au Setchouen (Chine Occidentale)—*Bull Soc Path Exot* 1919 July 9 Vol 12 No 7 pp 356-362

11 Note on an Epidemic of Cerebro-Spinal Meningitis at Chengtu (Szechwan)—*China Med JI* 1919 July Vol 33 No 4 pp 321-323

The author says that though cerebro spinal meningitis is met with in Eastern China it has not hitherto been reported, nor has he seen it, in the West. He here reports a small epidemic at Cheng-tu in Szechwan—six cases, five of which were in soldiers. Details of each case are given. Diplococci, not staining by Gram, were found in the fluid obtained by lumbar puncture

A G B

HARRIES (D J) Calculi of the Urinary Tract as seen in a British General Hospital in India—*Indian Med Gaz* 1919 June Vol 54 No 6 pp 214-215 With 6 figs

The author states that in Europeans in India calculi over $\frac{1}{2}$ inch in diameter are decidedly rare, he has never seen one over $\frac{1}{4}$ inch. Between June 1916 and December 1918, of 19,020 patients admitted to the 34th General Hospital, Ambala, 1,455 were submitted to operation and 6 had urinary calculi over $\frac{1}{2}$ inch in diameter. Details are given in a table, one calculus was of oxalate and four of urates coated with phosphates and pear shaped, in three of these cases there was a definite hydronephrosis

Small calculi are so common that at least one case a month is admitted for ureteric colic, numerous X-ray plates show, not very clearly, the calculi in the ureters

A G B

CROOKS (Charles H) Vesical Calculus in Siam—*China Med JI* 1919 Nov Vol 33 No 6 pp 545-550

The author writes that the records of the hospital at Lampang, Siam show stone to be the most prevalent of surgical diseases though he feels sure that not one-third of the sufferers is reached. He discusses the causes, such as faulty digestion, character of the drinking water, congestion of the internal organs induced by hard labour with very scanty clothing. As treatment preliminary to operation he advises catharsis and the administration of an anthelmintic and on the

importance of the last he lays stress. Of the three surgical procedures he employs generally the suprapubic operation and the crushing method rarely. For stones in the urethra he prefers incision anterior or posterior to the scrotum to instrumentation. Some illustrative cases are given. The paper contains numerous technical details, for which it must be read.

A G B

MASTERS (W E) [*Rickets in Central Africa*].—*Trans Soc Trop Med and Hyg* 1919 May 16 Vol 13 No 1 p 14 With 1 plate

This letter relates to the racial incidence of rickets. STANNUS having stated that rickets is unknown in all Central African races visibly known to him, the writer states that up to the year 1916 he would have agreed with STANNUS but in that year, in the Kasai Basin of Belgian Congo, he encountered a native boy about 12 years old who appeared to be typically rachitic. The boy's photograph and the specific details of his physical state are given.

A A

LEBOEUF (A) & GAMBIER (A) *Sur deux cas de milk-pox ou alastrim observés à Brazzaville (Moyen-Congo)*.—*Bull Soc Path Exot* 1919 Oct 8 Vol 12 No 8 pp 489-492

Two cases are described which correspond closely to the affection described as amas or milk-pox by DE KORTE in South Africa and as alastrim by RIBAS in Brazil. The disease differed from chickenpox in that the vesicles were crowded on the face and extremities and discrete on the trunk, were larger and evolved differently, and raised rosy cicatrices were left. As to small-pox, there was no secondary fever, no umbilication of the vesicles and no depression of the scars. A similar affection has been described as varioloid varicella in the West Indies (Jamaica and Trinidad) and has occurred at Sydney. The author explains its rarity at Brazzaville by the vaccination and revaccinations which are practised yearly in the neighbourhood of that town.

A G B

MOUCHET (R) & GÉRARD (P) *Contribution à l'étude des tumeurs chez les noirs de l'Afrique Centrale*.—*Bull Soc Path Exot* 1919 Oct 8 Vol 12 No 8 pp 567-581 With 2 plates

The authors refer to a paper by HUGENIN who described 16 cases of tumours in blacks. Their cases include those of some other doctors whose assistance they acknowledge.

Tumours of Connective Tissue.—Besides *lipomata* on the shoulders of porters, frequently seen, they have met with several in Batende woman, on the neck, at the point of pressure of a massive copper collar 6 cm thick. Amongst *fibromata* were 3 cases affecting the uterus, two found at autopsy together with ovarian cysts. With some hesitation the authors put juxta-articular nodules in this category, they believe them to be a manifestation of yaws. They draw attention

to fibromata of the vermiform appendix due to Bilharzia eggs, of which they have seen several, forming a series from a mere inflammatory reaction to a genuine fibromatous process. Two cases of uterine *myomata* appear in their statistics. Two large *angiomatic naevi* in a native are figured. Two *myxomata* are recorded. There were several cases of *sarcoma*—two of the lower jaw, one intra abdominal, one renal, and one of the leg which developed so quickly that it was incised as an abscess.

Tumours of Epithelium—Two *sebaceous cysts* figure. The contents instead of being yellow-white as in the European were greyish black. *Ovarian cysts* were always autopsy findings. An *adenoma* of the kidney was found post-mortem and goitre is mentioned as common in a district of the Katanga. *Epithelioma* is the rarest tumour found in the black race, one was seen in a woman of 40 in the vulvar region. Of *carcinoma* they have 7 cases, one on the breast (a woman from Lagos) and six of the liver all primary and all from the Upper Luapula river. These were of very rapid growth.

Mixed Tumours—One case situated in the neck. It contained the elements of carcinoma and of several types of connective tissue.

Writing of the malignant tumours they remark on the rarity of metastases and when they exist, their small dispersion. They point out also that few doctors in Belgian Congo see old people and especially women.

A G B

FISCHER (Walther) **Zur Kenntnis der Leberzirrhose in China**
[Cirrhosis of the Liver in China]—*Arch f. Schiffs- u. Trop. Hyg.*
1919 Oct Vol 23 No 19 pp 435-442

According to the author cirrhosis of the liver is fairly frequent in China and this was also the experience of HEDBLÖM in whose statistics 43 per cent of liver affections were cirrhosis [this *Bulletin*, Vol 10 p 225]. He discusses its aetiology and says that in China alcoholism plays but a small part. It is regarded as the cicatricial stage of a past destructive process, the primary process being necrosis of liver tissue. He proceeds to discuss cases in Chinese which he has anatomically examined. A case following smallpox three months before is described, there was nothing else which could be held accountable. KEISSELITZ and MAYER have described post mortem dull-red haemorrhagic foci, pinhead in size, in great numbers in the liver parenchyma, these were small necrotic foci. Typhoid is another cause, focal hepatic necroses in this disease are well known. Tuberculosis is a further cause mentioned, thus the author doubts, supposing that where tubercles are found in a cirrhotic liver an old tuberculosis had been awakened. He has seen a case of pseudo-tubercle in a cirrhotic liver which resembled true tubercle in every way but in the presence of the bacilli, the foreign body was probably a schistosome egg. This brings him to those cases caused by the deposit of *S. japonicum* eggs in the liver, and these, he believes, form a larger percentage of the cirrhoses of China. The diagnosis is made by finding the eggs in the stool. Another parasitic cause is *Clonorchis* infection, the anatomical changes correspond more to biliary than to ordinary cirrhosis. Here again the faeces examination gives the clue.

Lastly he mentions the infrequent occurrence of tumour formation in a cirrhotic liver. It may be regarded as an excessive regeneration, such as is seen on a small scale in every cirrhotic liver, at the other end of the scale come adenoma and carcinoma. He has seen one of each. He doubts whether there is such a condition as malarial cirrhosis.

A. G. B.

GRABHAM (M) On Some of the Indigenous Poisonous Plants considered in Relation to the so-called "Vomiting Sickness" of Jamaica—*Jamaica Public Health Bull* 1917 [First Year of Issue] pp 25-28

The author notes that there is probably no place in the world where so many noxious plants could be found in so small an area, but the native population is grossly ignorant about them. Poisoning by ackees is an instance. He gives a description of several of these plants: three species of *Jatropha* or physic nut, used to make fences round native cottages, the sand box (*Hura crepitans*) grown as a shade tree, the jequirity (*Abrus precatorius*), a climbing plant found on most cottage fences, mountain dogwoods (*Robynia* sp), several species of *Solanum*, wild strychnine, and the castor oil seed. Where death has occurred with symptoms suggestive of poisoning the possibility that the seeds or fruit of one of these plants is the cause should be borne in mind. He recalls that only 25 per cent of deaths in the island are medically certified.

A. G. B.

EARLE (Edw. R. C.) The Mineral Springs of Jamaica, what they are and what they ought to be—*Jamaica Public Health Bull* 1917 [1st Year of Issue] pp 57-70

The author, Health Officer, Port Royal, says that there are many mineral springs in Jamaica, two of which have been utilised for medicinal purposes, "namely the hot sulphurous spring at Bath and the warm salt spring at Milk River."

"The spring at Bath has a temperature of about 120 deg, but about 9 deg of heat is lost in its transit to the bath. The waters are sulphuric, and contain a large proportion of hydro sulphate of lime. They are said to be purgative, and are beneficial in gout, rheumatism, kidney and skin diseases."

"The bath at Milk River is one of the most remarkable in the world. It is a tepid, saline, purgative bath, the temperature remaining at about 92 deg all through the year round. It possesses a great reputation for the cure of gout, rheumatism, neuralgia and allied nerve complaints, and also in certain conditions arising from liver disorders."

A table shows that the Milk River spring contains chloride of sodium 20.7 parts per 1,000, and sulphate of soda 3.4 parts, besides other constituents. The history of these springs is given, both belong to the Government, their development has been neglected, and the author points out what an asset they might be to the Island. Suggestions are made to this end.

A. G. B.

TAYLOR (Frank E) On the *Spirobacillus Zeylanicus* (Castellani)
Jl Path & Bact 1919 May Vol 22 Nos 3 & 4
 pp 262-264 With 2 figs

The author describes and figures cultures of this organism from the stools of a chronic case of dysenteriform colitis in a patient who returned to England after 12 years' residence in Ceylon. He remarks on its extraordinary and puzzling polymorphism—a preparation from one and the same culture showing vibrio-like, bacillus-like, spirillar, and pseudospirillar forms, also on its practical interest, since it is Gram-negative and does not produce gas in any of the sugars, and its colonies cultivated on agar media, and on coloured special media such as Conrad-Drigalski, MacConkey, Endo, etc, present a fairly close resemblance to those of the typhoid-dysentery group of bacilli. The organism, which is most frequently found in dysenteric and dysenteriform stools, grows freely on all ordinary media, is motile, and stains readily with the usual reagents. Subcutaneous injection of a broth culture into rabbit and guinea-pig, as also intraperitoneal injection into guinea-pig, did not produce any ill effects.

A A

SAKAI (W) [Korean and Canton Ginseng]—*Ija Shimbun* (Med Neu.)
 1918 Jan 25 No 990 p 112

[From Review by R G MILLS]

The chief components of Ginseng are saponin, paraquillain, phyto-sterin ester, terpene, panacean, and fatty acids, the relative amounts of each depending on the age of the plant, and the method of preparation and age of the drug. Chinese and Japanese ginseng is inferior to the Korean product, but Canton ginseng (the best quality from China) is about as good as Korean. Ginseng is said to stimulate respiration and circulation while having a sedative effect on the nervous system, and also to be diuretic. It is used for insomnia, headache, sea-sickness, neurasthenia, and hysteria. The "dose" is 4 to 8 grammes a day. In susceptible individuals it may cause hyperaemia of the conjunctiva, epistaxis, and slight dizziness.

A A

WATKINS-PITCHFORD (W) An Injector for Batch Inoculations.—
Med Jl S Africa 1918 May Vol 13 No 10 pp 186-189 With 4 figs

This injector, devised by the Director of the South African Institute for Medical Research, was described and shown by him at a meeting of the Witwatersrand Branch of the British Medical Association. Its object is to simplify the procedure of administering injections of accurately measured doses of liquid to a large number of people. The principle is that the measuring chamber is both filled and emptied either by the gravitation of the liquid from a container suspended

at a higher level or by the impulsion of slightly compressed air, the advantage being that since the pressure is always positive infected tissue juice or blood cannot be drawn into the needle. The interior of the needle remains sterile even though the needle is repeatedly plunged into infected tissues. It is considered that the injector will prove serviceable in cases where more than 25 inoculations have to be made at one time. The injector is fully described with figures

A G B

ARKWRIGHT (J A) BACOT (A) & DUNCAN (F M) **The Minute Bodies (*Rickettsia*) found in Association with Trench Fever, Typhus Fever and Rocky Mountain Spotted Fever**—*Trans Soc Trop Med & Hyg* 1919 Feb 21 Vol 12 No 4 pp 61-73 With 8 charts & 2 figs

The authors describe and figure the minute organisms—usually coccus-like, or diplococcoid, or lancet-shaped, but of very variable form—found in the lice that transmit typhus and trench fever, the tick that transmits Rocky Mountain fever, and also in the “sheep tick” (*Melophagus*). They find that for detecting the forms found in lice fed on trench fever cases the best method is to make a film of the insect’s excrement, and to stain for 16 to 20 hours in Giemsa (1 drop to 1 c.c. H_2O), after fixing in absolute alcohol acidulated (1 per cent) with HCl to get rid of blood-debris.

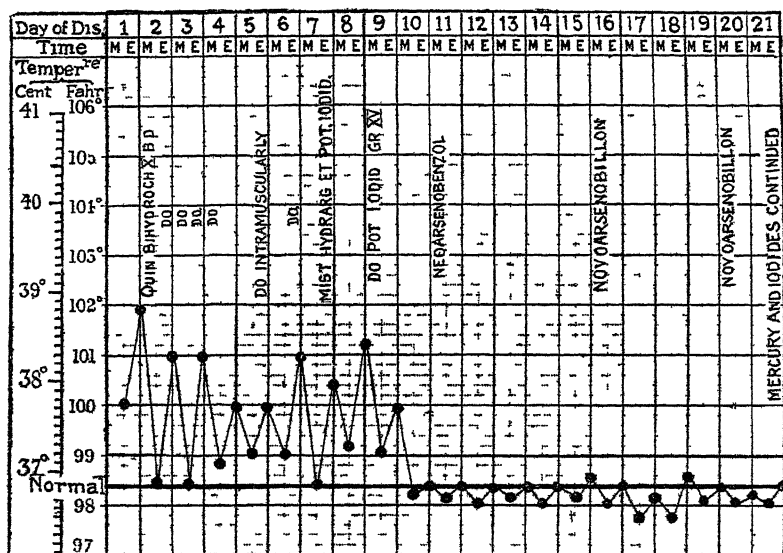
The authors found *Rickettsia* with considerable constancy in the excrement 8 or 10 days after feeding lice on a trench fever patient, especially if the insects were fed twice daily on the same patient beginning on the 1st or 2nd day of the disease. But they never found *Rickettsia* in lice fed on healthy men, or on lice fed daily on a man up to the fifth day after his inoculation with trench fever. They found further that the excrement of the infected lice became infective to man about a week after the first infecting feed.

The authors also found *Rickettsia* in one individual of a number of lice fed on a typhus fever patient. Twenty lice fed from this same source were inoculated into a common *Macacus* monkey which after 12 days incubation developed a febrile disease and died the 22nd day thereafter, no macroscopic cause being disclosed post-mortem. Monkey-lice (*Pedicinus*) taken from the dead monkey were emulsified and inoculated into another monkey and also into 2 guinea-pigs, all the animals after incubation periods ranging from 7 to 10 days had well-marked fever. In a considerable percentage (4 to 16 per cent of individual examinations) of monkey-lice fed on both monkeys at different stages of the febrile process *Rickettsia* were found, but only in one case did the authors find *Rickettsia* in the excrement. No *Rickettsia* were found in 75 lice taken from three normal monkeys.

The *Rickettsia* found in lice fed from typhus fever cases closely resemble those from trench fever lice, but they stain redder with Giemsa, sometimes seemed larger, and more often were of a lancet or segmented-bacillus shape.

in 14, and remittent in 10 cases (see this *Bulletin*, Vol 8 p 387-8). There can be little doubt that syphilitic fever in the tropics is often treated as malaria.]

A G B



REVIEWS

NICOLLE (M.), CESARI (E.) & JOUAN (C.) [Institut Pasteur] **Toxines et Antitoxines** VIII + 123 pp 1919 Paris Masson et Cie [Price 5 frs net]

This valuable book is not in any sense a systematic text book on immunity. It affords a brief and lucid exposition of the experimental work which Nicolle and his co workers have carried out on toxins and antitoxins over a period of about twenty years and which has been published mainly in the Annales of the Institut Pasteur. Such theoretical considerations as are entered into, represent either the interpretations placed by the authors on their own investigations or criticisms of the

Action on tissues	Incubation period	
	Present	Absent
Pure neurotoxins	Tetanus toxin botulinus toxin	Pure colubrine venom
Toxins which produce locally on subcutaneous injection a moist eschar	None	All, viperine poisons, e.g., Crotalus (death when rapid is due to 'arterial depression' and anaemia of the respiratory centre, when death occurs after several days renal lesions and emaciation are the outstanding features), some bacterial poisons (vibriosis, pyocyaneus, septique), sublethal doses given intravenously often cause no obvious effect
Toxins of type V (a modification of the foregoing, the lesions being characterised initially merely by a violet discoloration)		Coli typhoid group, b, pestis, gonococcus, meningococcus, pneumococcus, (b Shiga belongs to this group, but the affinity of its toxin for the caecum is a special feature)
Toxins which produce a dry eschar	All, e.g., diphtheria, ricin, abrin, croton	None

views of others in the light of the French workers' results. Special attention is devoted to the anatomical changes caused by toxins and to the analysis of the mechanism by which the most serious morbid effects are produced. This aspect of the subject has been hitherto comparatively neglected except in the case of those toxins (e.g., of b tetani and b botulinus) whose highly specialised action could scarcely be overlooked. Thus clinical features of the various forms of intoxication are fully considered and the effects in different species, as well as modifications due to dosage and to route of introduction, are described in detail. Great prominence is given to snake venom poisoning. In defining what is meant by a toxin, it is pointed out that the essential character is the capacity for leading to the development of antibodies,* whereas the

* Different antigens may, however, vary widely in their capacity for stimulating antibody production and certain toxins may possibly lack this property, e.g., the haemolysin produced by streptococci.

symptoms due to toxins may be produced also by other substances, even by inorganic poisons (e.g., the latent period in poisoning with mercuric chloride)

Toxins are classified according to their action on the tissues, and are shown in the Table

In connection with neurotoxins emphasis is laid on the fact that sublethal doses of snake venom neurotoxin cause only transitory symptoms, whereas in the case of tetanus and botulinus toxins recovery is very slow. This difference is attributed to the rate of destruction of the toxin in the body being slow in the latter, but rapid in the former case. The dry character is taken as evidence of a slower reaction rate than leads to the moist eschar, but it must be noted that the difference in the effect of the two types of toxins cannot be abolished by alterations in dosage. The authors hold the opinion that 'soluble' and 'insoluble' toxins (the latter being those which remain attached to bacillary bodies) are identical for any given organism. Among the evidence brought forward in support of this view is Nicolle and Cesari's observation that the serum of horses suffering from botryomycosis possesses all the properties of the Bride serum which is obtained by injecting soluble staphylococcus toxin. Further, MAGROU's experiments are quoted, in which, according to the dose of staphylococci injected into the testes of guinea pigs, a regular scale of lesions results, with the highest doses there is death from intoxication in a few hours, and, with diminishing amounts, a moist eschar, a diffuse abscess, an abscess containing the characteristic granules and, finally a granuloma containing epithelioid and giant cells. [Such experiments appear to the reviewer to be of great importance since it can scarcely be too strongly emphasized that the histology of an infective lesion is far from being an infallible guide to the nature of the causal agent.]

In their treatment of immunity reactions the authors follow the views of NICOLLE, ABR and POZERSKI according to which any antigen may stimulate the development of two types of antibody with opposed actions, viz., coagulines and lysines. The former produce agglutination, precipitation, and antitoxic action, the latter lead to cytolysis and complement fixation and, when acting in the animal body, produce anaphylactic reactions and hypersusceptibility to toxins. This theory has the great advantage of offering a logical and simple explanation of the action of antibodies, but it must be understood that it is in advance of what is at present known regarding the physicochemical aspect of the subject. Throughout their considerations on these difficult questions, however, the general perspective is admirably maintained and the brief introduction to the section dealing with the origin of antibodies is a valuable contrast to the schematic representations which were prevalent until lately. Thus in commenting upon the fact that among the higher animals different species may show marked variations in the antibodies with which they respond to a given antigenic complex, the authors succinctly sum up present knowledge by the statement that "la genèse des anticorps représente donc un véritable phénomène de résonance".

C H Browning

KIRTIKAR (Lieutenant-Colonel K R) [F.L.S., I.M.S. (ret'd)], BASU (Major B.D.) [I.M.S. (ret'd)] & "I.C.S. (ret'd)" **Indian Medicinal Plants.**—pp lxxii, 1419 (in 2 parts). With 1,033 plates (in 4 portfolios) 1918 Allahabad. Published by Sudhendra Nath Basu, M.B. Panini Office, Bhuvanésvari Asrama, Bahadurganj [Price 250 Rupees]

For many years the Government of India had, through its Indigenous Drugs Committee, given desultory and rather ineffective attention to the origin and use of indigenous drugs, but it required the stimulus of the war and the consequent scarcity of drugs up to then imported—many, if not most, of which could be made in India from plants grown in that country—to induce an attempt to give more sustained study to the subject.

of drug production. The production of one drug alone, Quinine—so important to a malaria ridden land—has recently been specially investigated and it is probable that a considerable expansion of Cinchona cultivation and of Quinine production will result. As regards other drugs a representative Drug Manufacture Committee has been appointed to take the place of the Indigenous Drugs Committee, and it is to be hoped that the new committee will be given more effective means than the old committee had to investigate the occurrence, collection and cultivation of medicinal plants and the manufacture of drugs, and the chemistry and therapeutic value of the latter.

This work on Indian Medicinal Plants has therefore appeared opportunely. In the preface Major Basu states that the difficulty he experienced in identifying medicinal plants for lack of a work containing illustrations, descriptions, vernacular names and uses of the medicinal plants of India led him to undertake the present work, in which he had the assistance of the late Lieut. Col. Kirtikar, I.M.S., and of an officer of the Indian Civil Service whose identity is modestly concealed. The book consists of two volumes of letterpress of over 1,400 pages and four box portfolios of 1,033 plates. As the pages measure 24 by 18 cm. and the plates 28 by 21.5 cm. the volumes in terms of avoirdupois are a weighty publication, and for library rather than camp use. Altogether 1,381 plants are enumerated of which 33 are cryptogamic and the remainder belong to 132 phanerogamic families. So if the Government of India now follow the example of the illustrious Indian monarch Asoka of over 2,000 years ago, and establish gardens for the growing of medicinal plants, they will have no lack of species to choose from.

Under each plant are given a list of the various vernacular names applied to it, its distribution, a description, the parts used and their uses and the real or reputed effects. The species are arranged according to the Bentham and Hooker classification, but descriptions of families and genera and keys of any sort are lacking. The descriptions of species would not in every case pass muster with botanists, for such things as the size of leaves, the number of sepals and petals and carpels are not always mentioned. The reader is therefore dependent to a large extent on the plates for identification. Most of the plates are, as stated in the preface, reproduced from well known botanical works, but the source of each plate is not indicated nor the explanations of the dissectional details given. The plates however are well reproduced.

The lists of vernacular names are comprehensive and, if used with the discretion recommended in the introduction, should be very useful. The writer recently identified a medicinal plant—of which only the vernacular name was available—by consulting this work after he had hunted elsewhere in vain. Of the nearly 1,400 plants enumerated only a small proportion is likely to survive scientific examination of their alleged therapeutic value. This is recognised by the authors, for they say in the introduction: "In this medical botany should be included all the plants that are used medicinally by the natives of the country. A very large number, perhaps the vast majority, of these plants will be found perfectly useless, but in the present state of our knowledge, we are not justified in excluding any from the list." The work is therefore comprehensive rather than discriminative.

Under uses are given the actual uses, when there are such, and often a heterogeneous mixture of facts, fancies and opinions, from Sanscrit times to the present day. Occasionally the chemical composition of the part used is given. No discriminative criticism has been, or for that matter could be, exercised by the authors in these catalogues of "virtues," which form a striking commentary on the need for scientific investigation of the medicinal properties of Indian plants. To take a somewhat extreme example, under *Achyranthes aspera*, a common Indian weed, more than a page is expended in telling us the uses of this plant as a pungent and laxative and emetic and diuretic, in dropsy, piles, boils, eruptions of the skin, hydrophobia, snake bites, insect bites, in colic in children, as an astringent in gonorrhoea, as a protective against scorpions, "the insects being paralysed through the presence of a twig," in ulcers and warts, in ear disease, in abscess in asthma and cough, as an application to wounds

caused by Babool thorns and as a talisman in hysteria. The authors of course have had to take their subject as they found it, and the above is an example of our present knowledge or rather ignorance. They have made what may be called a laudable reconnaissance survey of a very imperfectly known region that now calls for detailed examination on scientific lines by a team of botanists, chemists, pharmacologists and clinicians.

The book is well got up, printed on good paper with broad margins. There are a considerable number of misprints, which, with the best will, cannot all be set down to the Indian compositor, who setting up a language that he knows very imperfectly at best, is apt to make hay of it. The price of the book—R 250 in India is rather against its wide distribution even amongst the medical profession in India, to whom it is dedicated, but for those individuals and libraries, more particularly in India that can afford it, the book should form a very useful work of reference.

A T G

SCHWETZ (J) [Docteur special de l'Universite de Bruxelles charge d'une mission d'etudes au Congo Belge par le Ministère des Colonies] *Recherches sur les Glossines (Mouches Tsé-tsé) avec une carte d'ensemble, trois cartes de détails et cinq figures*—viii+151 pp [Royaume de Belgique—Ministère des Colonies Ecole de Médecine tropicale de Bruxelles] 1919 Brussels Hayez, 112 Rue de Louvain

Those who are in any way concerned in sleeping sickness problems, in Tropical African colonies and protectorates under the British flag, cannot fail to be interested in this record of observations upon Tsetse flies carried out in the North Katanga district of Belgian Congo. The region in question is almost unknown to Englishmen, but Dr Schwetz writes of it with authority derived from nine years' residence, in the course of which he has met with more species of *Glossina* than are usually encountered by a single observer elsewhere. A note on the fly leaf explains that the volume before us has been submitted to the Faculty of Medicine of the University of Brussels, with a view to obtaining a special doctorate for its author. The ten memoirs of which the volume is composed bear dates ranging from "November, 1913," to "July, 1919" and four of the papers have already been published in English or Belgian scientific journals. Without wishing to disparage the interest if not the importance attaching to many of Dr Schwetz's observations, we feel bound to take exception to his method of presenting them, which too often is prolix, is marked throughout by constant and tiresome reiteration, and entails much waste of time on the part of the patient reader in search of fresh facts and reliable deductions. To the medical entomologist the value of this publication would have been greatly enhanced by the provision of an adequate index, containing cross references by some very necessary editing, and above all by rigorous compression. On arriving, faint but pursuing, at the detailed account of Dr Schwetz's "Quarante et Unième Observation," one feels positively envious of those who had merely to endure the Scottish divine's "Sixteenthly and Lastly"!

The area covered by Dr Schwetz's observations, which lies between 27° and 24° E long, and 8° and 5° S lat, and is bounded on the east by the Lualaba and on the west by the Sankuru (Luhilash), is relatively small, being only about 220 miles square. Its altitude varies from some 1,600 feet in the north, to between 2,900 and 3,300 feet in the south, and the almost continuous "orchard bush" (*parc*) which is characteristic of Katanga itself, is found only on its south eastern border, the remainder consists of more or less typical "savannah" (veld, dotted with clumps of bushes and shrubs), interrupted here and there by true equatorial forest, either in the form of belts along the rivers and streams, or in patches of greater extent. Within the limits mentioned, Dr Schwetz has

encountered no fewer than eight species of *Glossina*, namely *G. palpalis*, *pallicera*, *morsitans*, *pallidipes*, *brevipalpis*, *fusca*, *tabaniformis*, and *fuscipleuris*; three of these, however, *G. pallicera*, *tabaniformis* and *fuscipleuris*, need not here be mentioned further, since only one or two isolated examples of them were met with.

With regard to *G. palpalis*, the observations made by Dr Schwetz in North Katanga do not add much to our knowledge, on the other hand the author mentions a most interesting experience in the west of Belgian Congo, which merits notice. During a recent sojourn in the Kwilu district, Dr Schwetz found the species in question permanently established in small isolated thickets near or actually in villages, on hills, and some times at a considerable distance from any water. The reason for this strange phenomenon is said to be the presence of pigs in the thickets referred to. As to the other known disseminator of sleeping sickness, Dr Schwetz (in a paper originally published in the *Bull. of Entomol. Res.*, for December, 1915) tells us that the north western boundary of the great *Glossina morsitans* zone, in Belgian Congo, coincides more or less everywhere with that of the wide expanse of Katanga 'orchard bush'. Bush fires, however, modify for the time being the limits of the *G. morsitans* area, by causing a true temporary migration of the insect. Thus, after the bush to the east of Katombe is burnt in the middle of the dry season, the fly invades the station in fairly large numbers, and may even be seen from 2 to 5 kilometres to the west of it, although its ordinary boundary lies a few kilometres to the east of the settlement.

The greater part of Dr Schwetz's volume is devoted to observations upon the habits and breeding places of three species—*Glossina brevipalpis*, *G. fusca* and *G. pallidipes*, of which the latter is in some respects less constant in its ways than either of the other two. As regards *G. brevipalpis*, Dr Schwetz confirms and amplifies most of the statements made ten years ago by SANDERSON and DAVEY, though, unlike SANDERSON, he never found the fly resting "under the leaves of bushes, or in the grass". Whether at rest or on the wing, *G. brevipalpis*, *pallidipes*, and *fusca* according to Dr Schwetz, prefer and are found almost exclusively along roads and paths. Where found, *G. brevipalpis* occurs indiscriminately in forest, orchard bush, and even well wooded "savannah", *G. pallidipes* on the other hand, frequents orchard bush or well wooded savannah, but as a rule is not found in forest, while *G. fusca* is restricted to forest, and usually, though not always, to the vicinity of water. All three species spend the day, or in any case the greater part of it, sitting motionless on the trunks or branches of trees, or on creepers, the resting attitude being head downwards in the case of the two larger species, while *G. pallidipes*, like *G. palpalis* and *G. morsitans* usually sits with its head in the opposite direction. *G. brevipalpis*, according to Dr Schwetz, who was the first to meet with the species to the west of the Lualaba, is less ravenous than its congeners, although the females are much more blood-thirsty than the males. Specimens taken on the wing were almost invariably males; on tree trunks females were very often caught though never in greater numbers than 10 per cent. *G. brevipalpis*, which often occurs in swarms, does not fly high but flits low (Dr Schwetz writes *voltige*) over the ground, though it may be seen on the wing in the early morning, its real period of activity is from about half an hour before to half an hour after sunset. *G. pallidipes*, where it exists is stated to occur in very large numbers, sometimes almost equalling those of *G. morsitans*, seems to have the same habits as *G. brevipalpis*, i.e., it is active in the evening, when it flits low over roads and paths. It is, however, on the wing earlier and disappears sooner than the larger species, its time of maximum activity being given by Dr Schwetz as about 4 or 4.30 p.m., while towards 5 p.m., or an hour before sunset, it vanishes completely. *G. fusca* is stated by Dr Schwetz not to occur in swarms like *G. brevipalpis*, although where it exists it is often present in numbers. It is a more bloodthirsty species than *G. brevipalpis*, and much more silent on the wing, although it often tries to bite at any hour of the day, the night is its real period of activity, the time when it is most lively being about two hours after sunset. Records of Tsetse flies feeding on anything but blood being like "angels' visits," the reader will note with interest

that, on several occasions in the afternoon Dr Schwetz saw a male *G brevipalpis* settle upon a leaf of some low growing plant (especially *Amomum* sp., a very widely distributed member of the Zingiberaceae known to the natives as "Muntungulu"), bury its proboscis therein and suck

Into the varying fortunes of Dr Schwetz's protracted search for pupae we have no space to follow him. It may be mentioned however, that pupae or puparia of more than one species were frequently met with together, and that in other respects the results obtained were for the most part in accordance with established facts. The finding, however, of a puparium of *G palpals* at a distance of 100 metres from a stream would seem to show that Dr G. D. H. CARPENTER's recently published generalisation, that pupae of this species "require to be within 20-30 yards of water," should not be taken too literally. Dr Schwetz's "record" was the finding of 205 puparia and 9 pupae of *G fusca*, and 9 puparia and 1 pupa of *G brevipalpis*, beneath a single prostrate tree.

In spite, however, of the suggestiveness of the find just mentioned, Dr Schwetz apparently does not share Dr CARPENTER's confidence in (at any rate he does not allude to) "attractive artificial 'pupa shelters,' as an effective means of reducing the numbers of *G palpals*." In fact he shows himself something of a pessimist, and, while stating that the measures for combating human trypanosomiasis hitherto in vogue in Belgian Congo have been framed upon wrong ideas, and have accordingly ended in almost complete failure, he sorrowfully admits that, up to the present, his own investigations have been devoid of any practical prophylactic result whatever. Still, the last word has not yet been spoken, and Dr Schwetz's conclusion is that existing methods of prophylaxis should be reconsidered, and remodelled on fresh rational and scientific lines, which must be based on continued and close study of the habits of the different species of *Glossina*. Secondly, the distribution of the various species of the genus in the different regions of Belgian Congo must be investigated systematically. Finally, and concurrently with the foregoing the question of the transmission of various trypanosomiasis by the different species of *Glossina* must be studied. The future of the great Belgian colony is intimately connected with an exact knowledge of the habits and distribution of these Diptera.

E. E. Austen

TROPICAL DISEASES BUREAU

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APPLIED HYGIENE IN THE TROPICS

By COLONEL W G KING, CIE, IMS (Retired)

DISEASE PREVENTION

MALARIA

Malaria in Indian Cantonments

The Army Sanitary Commission appointed in 1859 to report on the sanitary state of the Army in India, made the following remarks in reference to the prevalence of malaria

"One of the earliest discoveries of these facts [preventive measures] was that intermittent fevers disappeared from places which they formerly ravaged, after drainage of the soil and improved cultivation. Under improved drainage and other sanitary improvements fevers of the intermittent type have almost ceased to exist in certain localities where they formerly prevailed. Nothing is likely to prove more advantageous to the climate of Indian environment than the clearing away of jungle, the draining of useless swamps and an intensive cultivation of waste land."

Such statements appealed to facts, there was of course lacking the reason why—that remained for Ross to establish. The Commissioners proved it was decidedly an economically unsound method of maintaining a standing Army to permit death to diminish its strength at the rate of 69 per mille per annum from various causes, amongst which were ranked "fevers." In the diminution of mortality from "fevers," India has undoubtedly made much advance in late years—more especially in respect to prevalence of typhoid and paratyphoid fevers—following the large employment of inoculation and the search for and segregation of carriers in the Army. Diminution too of malarial fevers has resulted from adoption of minor anti-malarial measures, but there has been a lack of faith as to the adoption of that radical method—drainage—as to which the early Commission rightly expressed their confidence

One of the instances in which in pre Ross days the dictum of the Army Sanitary Commission had been attended to in practice was at Kamptee where the sickness, in 1834, was sufficiently striking to cause the Secretary of State to ask for a special Report, the general average of sick was then 253 *per cent* of strength. In consequence of this reference, there was advised "drainage of the swamp in front of the parade ground of Madras European troops and the barracks, of the Horse Artillery" This was followed by an amelioration of conditions. Doubtless several other instances of the application of drainage can be quoted in respect to cantonments—but any works on a large scale have yet to be put into effect, though doubtless from time to time they have been duly discussed. It is therefore gratifying to find from the Report of the Sanitary Commissioner with the Government of India for 1917 that at Kirkee a "drainage scheme has now been begun at a cost of Rs 7,000 per annum*, Rs 60,000 more will be required"

The Director of Medical Services in India, in his Report embodied in that of the Sanitary Commissioner with the Government of India for 1917, gives a table (p 7) in which he shows the principal Cantonments "arranged in order according to the malaria admission rates" In 16 stations thus quoted, Secunderabad heads the list with 697 *per mille* of strength, the second place is occupied by Peshawar† with a ratio of 468.8 to its credit. Possibly, with the dawn of better conditions subsequent to the great War, one or other of the various schemes which have been enunciated in regard to these two Cantonments may be given effect to. In the meantime, the long pending problem as to whether the State or the men should provide mosquito nets has been solved. The Director of Medical Services states —

"During the year an India Army Order was issued forbidding the wear of 'shorts' and 'kilts' after sundown. Mosquito repellants and veils were sanctioned for men on guard at night in areas where mosquitoes were prevalent. Mosquito nets were sanctioned for all British troops and their families"

Malaria in Malaya

From the Malaria Bureau, Federated Malay States, Dr H P HACKER (the Medical Entomologist) has issued Vol I of an intended series of Reports‡. The object is not to support a foreshadowed theory, but to record impartially various data bearing on the whole subject of malaria, as observed from time to time. It is thus hoped to secure trustworthy conclusions. As is well known from the work of Dr Malcolm WATSON, there is much difference in the mode of malaria

* Finance may probably dictate this piecemeal method as imperative, but, if the scheme were really necessary, to have raised a loan and have completed the work rapidly would have represented better financial economy—by prevention of mortality and of duty disability and its accompanying unproductive expenditure.

† About 1868 a Committee, of which DEMPSTER of spleen index fame was a Member, advised abolishing of wet cultivation within a mile zone of Peshawar. So far this has not been adopted.

‡ FEDERATED MALAY STATES Malaria Bureau Reports Vol 1 1919 Nov 76 pp with 24 photographs & 2 plans 1919 Singapore Printed at the Methodist Publishing House

production in the plains, as compared with the hills of Malaya, whilst the treatment of the plains by means of open drains has been rapidly followed by improved condition, in the hilly part the ravines have proved a constant source of trouble as to eradication of pools. WARSON recognised that in the two areas he had different anopheles to deal with. In his Report on the anti malaria drainage work in the vicinity of Kuala Lumpur, Mr EVANS, the Executive Engineer of the Malaria Board, placed it on record that with the changed state of soil and moisture supply following clearance of jungle and drainage, a new anopheline took the place of the former resident. In his Report on Malaria in Bengal, Major FRY, I M S, noticed in areas closely adjoining a sudden change of fauna, coincident with change of physical conditions. Such observations are but exemplifications of the long recognized fact that conditions favourable for the breeding of certain mosquitoes are not necessarily so for others.

The following table appears at page 84 of the Report —

TABLE H.

Characteristic breeding place	Species	Times found	Specimens
Small open pools and seepage areas in open hilly country.	<i>A. maculatus</i> †	31 (19L)	177*
	<i>A. rossii</i>	46	252
	<i>A. kochi</i>	24	53
Large grassy pools and streams in open swampy country	<i>A. aconitus</i> †	4	7
	<i>A. fuliginosus</i> †	21	170
	<i>A. sinensis</i>	69	216
	<i>A. barbirostris</i>	90	536
Jungle In swampy patches of low lying jungle and along the course of streams in jungle covered ravines	<i>A. umbrosus</i> †	76	542
	<i>A. albotaenarius</i> var <i>montanus</i>	37	189
	<i>A. brevipalpis</i>	10	23
	<i>A. tessellatus</i>	17	25
	<i>A. leucosphyrus</i>	20	49
	<i>A. aitheni</i>	42	198
	Total	487	2437

* 18 larvae hatched, all were *A. maculatus*

† Species usually recognised as carriers of malaria

The following extracts show some of the more important observations made by Dr HACKER —

"The felling of vegetation allows the entry of light loving species, and the commonest species found in a newly opened ravine are *A. sinensis* and *A. maculatus*

"If a ravine is to be opened steps should be taken to prevent the access of the dangerous species *A. maculatus*"

He attaches several photographs to the Report, from one of which he desires the following lesson to be derived —

"The photograph is taken with the railway behind the camera and the large open swamp is due to the virgin jungle being killed by water, which

has accumulated, probably, because natural drainage from the jungle has been blocked by the railway. The intact low lying jungle is seen in the background and on both sides of the picture. In the central swamp *A fuliginosus* and *A aconitus* were obtained. In the intact jungle these species were not found, but *A umbrosus*, *A tessellatus* and *A brevipalpis* were present. *A sinensis* and *A barbrostris* were found in both places, but were more common in the open swamp."

After discussion of the distribution of Anophelines he reaches the following conclusions —

"(a) It is of little use, from the anti malarial point of view, to do extensive filling of swamps if the relatively inconspicuous breeding places of *A maculatus* are not destroyed at the same time, as *A maculatus* is probably the most virulent species present.

"(b) The natural conditions were so unfavourable to *A maculatus* that it was found breeding in an old kerosine tin. In spite of this, however, it was never found in jungle or secondary growth.

"(c) *A umbrosus* is not necessarily limited to the coastal area, as commonly stated, but may be found plentifully as far inland as Gemas.

"(d) If the opinion of Dr Watson on the pathogenicity of *A umbrosus* is justified, the jungle in this neighbourhood cannot be regarded as harmless.

"(e) If, however, the low lying jungle were to be cut down, *A aconitus* and *A fuliginosus* would appear in the open swamps left behind, if jungle covered ravines were to be opened, *A maculatus* would appear, and the results would almost certainly be worse than the present condition.

* * * * *

Among suggestions for malaria prevention are the following —

"(b) Swamp filling. If the above point is kept in view, as much swamp filling as possible is advisable. The filling should be begun at the upper end of the swamp. When it is begun at the lower end, as in two cases noted recently, the filling is saturated with water and breeding is found on its surface, and, moreover, the water is dammed back in the head of the ravine forming suitable breeding places for the large pool breeders.

"Care must be taken, also, that in obtaining the material necessary for filling, breeding places suitable for *A maculatus* are not made. It is quite possible to dig away enough of a hill to expose the ground water level, and thus produce an area of seepage eminently suitable for *A maculatus*.

"(c) 'Jungle Treatment' of ravines as an anti malarial measure. In further opening of the hill jungle, which is necessary for the development of the place, an attempt might be made to keep the ravines, which contain practically all the water, and therefore all the breeding places, under the original jungle and so prevent the access of *A maculatus*.

"If this measure is adopted, the ravines should be watched very carefully as there is a likelihood of silt from the opened hill side killing patches of jungle.

"The population must be watched, also, lest they make a way down to a bathing place in the ravine. Photograph 13 illustrates this danger very clearly. It shows an open bathing place in a ravine covered by secondary growth and long grass. Throughout the rest of the ravine breeding places were rare, and the only species obtained were *A barbrostris* and *A sinensis*, but at the bathing pool *A maculatus* L was found.

"(d) Ravine drainage. If it be decided to drain the ravines, this should be done, as recommended by the Executive Engineer, Malaria Advisory Board, before the jungle is cut down. Photograph 14 shows the wrong method of commencing to drain a ravine, for in the pool by which the assistant is standing, *A maculatus* was obtained, and it is highly improbable that it existed in such a situation before the vegetation was cut down.

"(e) Methods against *A umbrosus*. These consist of draining and felling the low lying jungle, and might well be undertaken since *A umbrosus* is a proved carrier of malaria. Here again it is advisable to drain the jungle before felling it, as it would be unwise to replace *A umbrosus* by *A aconitus* or *A fuliginosus*."

Malaria Prevention in Algeria

In reply to a letter from Col W G KING, Dr Edmond SERGENT sends a letter the translation of which runs as follows —

Institut Pasteur d'Algerie,
Algiers,

9th December 1919

My dear Colleague,

The Governor General of Algeria has handed to me your letter of 29th October 1919 in which you ask for information about the effect on malaria of the large drainage works carried out before the year 1870 in the Algerian plains

When the French reached Algeria they found the country given up to barbarism. The splendid colonies founded by the Carthaginians and Romans in the plains of the littoral had disappeared, and bush and marsh had invaded the fertile valleys and the great plains of the sea shore. The natives were, and still are, profoundly infected by the malarial poison which they are now able to withstand by what is called "relative immunity," an immunity which is in any case precarious, and has not prevented the race from showing evident signs of long continuing malarial infection. On the other hand, *Anopheles* are not wanting in any part of Algeria, from the littoral to the most distant oasis in the Sahara, and at all altitudes. We have found them, ever ready to bite, on the summits of the Atlas Mountains at more than 1,600 metres altitude. The North African species are — *Anopheles maculipennis* which is found everywhere on the coast, in the steppes, and in the Sahara, *Anopheles algeriensis*, a close neighbour of *A. bifurcatus*, which haunts the coastal thickets, a somewhat wild species, *Pyrethrophorus myzomyiaefacies* which is only found in the mountains, *Pyrethrophorus chaudoyei*, limited to the oases, *Pyrethrophorus sergenti* which has been met with only at the edge of steppe region and of the Sahara.

The reservoir of the virus and the Anophelines being everywhere numerous, the French Expeditionary Force, which landed on the 14th June 1830 at Sidi Ferruch near Algiers, became widely infected during the following summer and in the succeeding years. The same was the case with the colonists, the first generations of whom, in many villages, disappeared entirely. We have no statistics of malaria at this time, and the less so since under the name of fever several quite disparate infections were confused. In any case the sanitary condition of the African Colony was so bad that in a book written in 1841 entitled "La question de l'Algerie" General Duvivier, one of the heroes of the conquest, as a solution of this "question of Algeria" contemplated its evacuation by the French, in consequence of the fevers which ravaged both the Army and the civil population. It is in this book that the famous phrase is found, "In Algeria the only colonies which prosper are the cemeteries."

If we compare this lamentable state of things with the much less unfavourable situation on which the English Commission reported at the end of the Second Empire, we can affirm that three new important factors had intervened

1 *Works of Drainage*—An enormous labour was accomplished, huge spaces were drained. the plain of the Mitidja on the Algiers side, the plain of Bone, the plain of Habra in the Department of

Oran In this way certainly a number of large marshes were suppressed, but our opinion is that it is not possible to attribute the chief merit of the sanitary improvement obtained to these large drainage works. The advantage of drainage channels is that they transform the inaccessible haunt of the Anophelines constituted by a marsh into a haunt which is accessible, namely a network of canals, but drainage never gets rid of these haunts entirely and its action is therefore limited. Thus the three regions mentioned by the English Commission of 1867, Fondouk, the Halloula lake, the plain of Bone have remained to this date formidable foci of fever for the inhabitants, who do not benefit from the modern anti-malarial measures. Since the beginning of our studies on the malaria of Algeria, which go back to 1902, we have been struck by the illusory character of the sanitary improvement which is believed to be obtained by large drainage works for this reason we have come to distinguish two kinds of anti-larval measures: great anti-larval measures which belong to the province of the engineer, and small anti-larval measures (such as the clearance of grass, oiling, alternation of water channels, etc.), without which the large measures have a very limited effect. Recently the Italian school has come over to our point of view, calling what we describe as small anti-larval measures "*piccola bonifica*."

To sum up, large drainage works have played a part in malaria which is certainly useful but is very limited. They have not really succeeded in sanitating the regions of which the English Commission spoke in 1867. Their role in this kind has been secondary. Any value they have had in malaria is due to the fact that they have permitted the cultivation of the country.

2 *The putting of the country under cultivation* is in our opinion the principle factor of the hygienic betterment of Algeria. When the French arrived, the alluvial regions of the plains and valleys were, as is the rule, at once the most feverous and the most fertile. The drainage channels have not suppressed the Anophelines, but they have enabled the bush to be cleared. The colonist has, little by little, transformed a country of jungle, dwarf palms, mastic trees, cistuses, agaves, Barbary figs, oleanders, etc., into a huge garden—well maintained vineyards, orangeries, fields of grain, kitchen gardens, orchards, etc. The plough loosening the soil has made it permeable to rain which no longer remains stagnant. Now that the ground had become productive and gone up in value, the colonist hastened to develop the largest area possible, uncultivated hollows with stagnant pools were banished. Cultivation invaded even the river banks. Thus by slow progressive toil the haunts of the Anophelines have disappeared under the ploughshare.

Moreover *la paix française*, suppressing intestine war and preventing the return of great famines, brought high wages to the natives, their well-being was improved, their malarial infection was attenuated, and little by little the reservoir of virus began to disappear.

3 Finally the Military Surgeon Maillot in 1834-1836, when he had several malarial patients to treat in the Bone Hospital, learned to make use of quinine, recently isolated in Paris by Pelletier and Caventou, which had been hitherto employed in too small doses. The wide diffusion of quinine, with which the natives are well acquainted under the name of "*quina*" and which they demand on

their own account, facilitates the disappearance of the malarial reservoir

The memorable discovery by A Laveran in 1880, at the Constantine Hospital, of the parasite of malaria, a discovery which has opened up a new epoch in the pathology of warm countries and the discovery of the part played by *Anopheles* in 1897 by Ronald Ross gave us the foundation of a really scientific anti-malaria prophylaxis In Algeria, thanks to Governor General Jonnart, an anti-malarial Service was organised in 1902, and has continually increased its radius of action

To come to the precise subject of your letter, and to conclude this rapid expose our opinion is —

1 Great drainage works do not suffice to clear a country of malaria They are useful especially in that they permit the putting of it under cultivation, and they should always be supplemented by small anti-larval measures, repeated yearly

There are no statistics of malaria in Algeria, because of the very great number of natives, and even of malarial colonists, who escape all medical control In any case one can affirm that the regions of which you speak—the Bône plain, Halloula lake, Fondouk—are still amongst the most fever-ridden in Algeria, though they are the best drained

2 The real agent of the slow but progressive sanitation of Algeria has been clearing and cultivation of the wild regions Everyone in Algeria knows the celebrated example of the small town of Boufark, in the middle of the Mitidja plain Once it deserved the nickname of "The Frenchman's grave" It became healthy when it became wealthy At present it is the centre of rich vineries, fine orange-plantations of essence yielding plants, and its gardens have won for it its new name of "Emerald of the Mitidja" It is the finest example of the effect on the public health of getting a wild tract of land under cultivation

3 Finally, in our opinion, modern prophylaxis must have as its final aim to hasten the cure of the carriers of virus by quinine treatment, and by the general improvement of their well being, and secondarily, by anti-larval measures great and small, during the time needed for their cure, it tries to hinder excessive multiplication of anophelines in the neighbourhood of important centres of population Quinisation of healthy persons is therefore a temporary measure, which should last just so long as the reservoir of the virus is incompletely suppressed The individual or collective protection of houses by mosquito netting and wire gauze is a measure of general hygiene, essential to comfort in warm countries

(Signed) EDMOND SERGENT

The observations kindly supplied by Dr Edmond SERGENT are of much value and interest generally in respect to anti-malarial measures, and especially in tracing the results of the anti-malarial engineering works undertaken by the French Government prior to 1867, in the interests of the health of their Army of Occupation in Algeria Dr SERGENT has a world-wide fame as a consistent advocate of the employment of quinine prophylaxis of populations, to which he would add body protection measures and the usual minor anti-

malarial methods. Particularly, would he press upon attention the influence of jungle clearing followed by cultivation. With such views British practice would concur—provided that means of relief of surface and sub-soil water existed in the area dealt with, which implies efficient drainage—artificial or natural—in accordance with the requirements of the local peculiarities of soil, subsoil and general topography, it is rarely that in any stage of anti malarial progress it is possible to use solely one of the several recognized anti malarial measures. *Only on such conditions being satisfied would it be possible for soil aeration to be effected in a manner rendering prosperous agriculture feasible.* Indeed, it will be seen from the following abstracts and extracts from the “Report on the causes of the reduced mortality in the French Army serving in Algeria” (Parliamentary Paper No 19,447 (Spottiswoode), 1867), that the Members of the Commission had no less faith in the importance of Agriculture in meeting certain anti-malarial requirements than Dr SERGEANT possesses. It is unfortunate that no statistics are available which would compare the health condition of the people of the present day with those of the past generation —

Occupation of the country was first effected in 1830. In the earlier years the mortality of the French soldiers was 80 per mille. In 1859, it was 56.7, 1860, 17.8, 1861, 11.3, 1862, 12.21, 1863, 12.29, 1864 (period of military operations), 21.23—the disease rate being 14.48. Near marshes the death rate of the Civil population was 7.3 per mille, at a distance from marshes 4.0 per mille.

Bone was found possessed of deep rich alluvial soil saturated with water. “It was determined to drain the plains, which was done by means of large deep main drains similar to those executed in marshy districts at home and by forming a system of surface drains over the area led into the main outfall. Market gardening and agriculture were conducted over the surface.”

Foudouk, the Commissioners considered, was improved but not cured by simple and good agriculture. “The subsoil was black, oozy, rotten and saturated with water, which also lay in pools. The now drained and cultivated ground in the vicinity presents the aspect of a dry rich healthy soil.”

Lake Halloula was drained at a cost of £10,000. The main drainage canal is about 5½ miles long, and has numerous subsidiary channels. “The effect on the neighbourhood has been decisive. The villages which formerly suffered severely from remittent fevers, often taking the fatal form of pernicious fevers, are now healthy, and they have been freed from swarms of mosquitoes* which during a part of the year made life almost intolerable.”

In the town further measures however were taken, subsoil drain pipes were laid at a depth varying from 3 feet 6 inches to 6 feet or 7 feet, according to the depth required to secure necessary fall. These pipes were laid in the lines of the public streets. “The practical results of the work has been that whereas formerly the water level was at or above the surface of the ground, it was 20 inches or more below the level of the surface. A good water supply accompanied the drainage works.” In this town, the mortality per mille in 1843–46

*They however failed to see that there was any connection between mosquitoes and malaria.

was 57, in 1862, 24 8 and in 1865, there had occurred only "18 to 20 deaths" Pernicious fevers are said to have disappeared since the works were executed, and other milder types of fever are of rare occurrence The Commissioners say—"The first thing that struck us on entering the town was the healthy aspect of the people, especially the children, and some we saw would have been a credit to the healthiest spots in England so far as appearance went"

In the following whole-hearted paragraph, the Commissioners make a statement which fully supports Dr SERGENT's warm advocacy of Agriculture as an anti malarial measure—"The whole evidence goes to show how much the general health of all countries is dependent on the condition of their agriculture, that in warm climates this is really a fundamental consideration, and that in all countries the health of the people and their progress in material improvement are indissolubly connected with each other It is in this way that Agriculture becomes in reality as essential a part of sanitary administration for improving the health of the country populations as drainage, water-supply and general town improvements are part of the public hygiene of towns"

TYPHUS AND RELAPSING FEVER

Col W HUNTER * C B , A M S , in a paper read at a Meeting of the Section of Epidemiology and State Medicine of the Royal Society of Medicine, has placed on record the history of the sanitary campaign conducted by him in Serbia against typhus fever, and relapsing fever of the European type The details have an interest for the tropics as well as for temperate climates

Col HUNTER and the Officers deputed to act under him arrived in Serbia on 4 March, 1915, he found himself confronted with a position which demanded rapid and drastic action The Serbians had driven back the Austrian invaders of their country, and, in the pursuit which followed, were infected by the prisoners they captured These were distributed throughout the country in aid of agriculture and other work, with the result of infecting both the civil population and the Serbian army By 3 April, there were in hospitals 8,200 cases of typhus and 8,500 of relapsing fever Col HUNTER found the "conditions in hospital indescribably bad, overcrowded, sanitary arrangements non-existent, no disinfection arrangements, whilst there was urgent need not for surgical appliances and help and surgical measures, but for beds and blankets, bed linen, shirts and clothes for the mass of 15,000 fever patients" Col HUNTER at once directed the attention of the Serbian Parliamentary Sanitary Commission to the necessity for active measures against lice as the great disease bearers This advice was cordially accepted by the Commission and was issued by it to the country at large in Circulars which embraced the terms—"Death to all vermin, how to wage this new war, how to kill lice, bugs and vermin by simple practical domestic measures"

*The Serbian Epidemics of Typhus and Relapsing Fever in 1915 Their Origin, Course, and Preventive Measures employed for their Arrest—*Proc Roy Soc Med Sect of Epidemiology and State Med* 1919 Dec Vol 13 No 2 pp 29-158 with 1 map & charts,

It was declared that the following were—

“The Measures that should be adopted by Government, Town and Hospital Authorities to prevent the spread of Typhus and Relapsing Fevers

(1) By compulsory notification, isolation, and disinfection, in the case of hospitals

(2) System of notification in towns and villages—and by house holders

(3) Personal cleanliness of patients and of destruction of vermin in all bedding, clothing, bedsteads

(4) Removal to hospital where possible

(5) Personal interest of each individual in combating these diseases

(6) Public interest to be aroused by pamphlets and newspapers

(7) Supplies of disinfectants and arrangements for disinfection by public authorities

(8) Formation of public disinfecting stations, and lastly,

(9) *The formation of the newly improvised steam or ‘barrel disinfectors’** devised by Lieutenant Colonel STAMMERS, so simple in character, so inexpensive, and so easily made, that they could be formed in any number required in every village, and even in every household in the country”

But whilst the Serbian barrel was freely used in towns and villages throughout the country, the principle of disinfection, or rather deminestation, was aided by further measures —(a) Suspension of railway traffic, (b) Stoppage of leave from the army, (c) Mladenovac quarantine and cleansing station, (d) Formation of “English sanitary disinfecting train”, (e) “Barrel disinfectors” devised, (f) Railway van disinfectors devised, (g) Railway van douche baths devised, (h) Cleansing of railway stations and rolling stock, disinfecting and bathing stations

The first item (a) is certainly such as to cause pause in the incurring of responsibility. Col HUNTER however, apparently realized the truth of the old dictum that the way to treat a nettle was to grasp it firmly, and made the policy of temporarily suspending traffic a point of importance. Nothing of course but the desperate condition of the country would have justified this. The order was carried out to the extent of allowing but one train per day to pass through the country. This arrangement secured, he established a quarantine and disinfecting station at Mladenovac “the junction of the first army areas (A) with the army area (B) so as to shut off area (A) from area (B), and to hold up all infection from coming from the two great army areas (A and B) and to prevent its spread southwards to areas (F) even after the railway traffic was resumed”. The suspension of traffic order was put into force on March 18 up to March 30, but, on Col HUNTER’s urgent advice, the period was extended up to April 15. It was thought by this extension it would be possible to reap the full benefit of the chief measures of prevention, namely, “formation of the Mladenovac disinfecting station and a special sanitary train for disinfection and inoculation”. A “sudden check in the epidemic had set in on March 16 as shown by arrest in number of cases in hospitals and in admissions. With the resumption of traffic and the general grant of leave to the Serbian soldiers there occurred a marked recurrence”. The trains were now crowded,

* “The Serbian barrel” is now a well known apparatus for makeshift disinfection by steam, and its adoption by Lt Col. STAMMERS undoubtedly proved of very great importance in aid of Col HUNTER’s scheme. It would however be erroneous to assume that wooden barrels for disinfection were first employed in Serbia.

"affording all the conditions favourable to infection. Assuming infection to have been contracted at this time (April 16 to 20) and allowing for an incubation of twelve days as an average the cases contracting infection would develop the disease about April 27 to May 1"

Col HUNTER holds that the data collected by him—

"show that on the 27th the admissions of typhus rose from 228 to 611 cases, and April 30 to 553 cases, those of relapsing from 89 cases to 304 cases. The daily average admissions of typhus for the five days April 22 to 26 was 230. It rose the following five days to 338 cases. The leave granted was for ten days. The men who left for home between April 16 and 20 were therefore due to journey back to their units approximately about April 26 to May 1. Assuming possibilities of infection being contracted by travelling back to the army areas, and allowing for an incubation period of twelve days, cases infected would develop the disease about May 8 to 14. The figures in Table, p 62, show that on May 8 to 19 the admissions of typhus into the army areas were 340 and 285 cases. Moreover, most interesting of all on the 9th, no fewer than 162 cases were admitted in area A—the area in which in the preceding twelve days the admissions had been very low"

Col HUNTER pays a great tribute to the national character of the Serbians, having been once convinced of the necessity for action all measures were carried out with thoroughness. The general cleansing process was not confined to public buildings but was adopted wholeheartedly in private dwellings.

Spirillum Fever Prevention

When a Hindu housewife purifies her abode, she finishes the process by liberally plastering the flooring with cowdung. In the light of modern aestheticism, educated Hindus have endeavoured from time to time to show that, irrespective of the sacred character of the source of the material used, it is an aid to disease prevention. Fortunately bovine tuberculosis is rare in India, so that little dread of spread of that disease from the habit need be feared. Possibly, the following extract from the Annual Medical Report of the Uganda Protectorate, for 1918, in regard to spirillum fever, makes the nearest approach to the existence of a sanitary defence of the custom *

"It is worth recording that the Lukiko Prison at Mengo, built five years ago of sun dried brick without any cement floor, has been kept free from ticks by scrupulous cleanliness and the application of fresh cow dung once a week.

"This gaol, though visited occasionally by a Medical Officer and the District Commissioner, is entirely under native control and in view of the danger from tick infestation from the constantly changing number of criminals, it reflects great credit on the control."

TYPHOID FEVER

The following figures show the extent of prevalence of typhoid fever in British Guiana 1918 †. It is true, it shows decrease in incidence

* Cowdung, instead of being put into the fields whence it came for purposes of manure, is largely used for fuel. The cowdung for this purpose is collected, moulded into flat cakes by hand and is placed against walls of dwellings or outhouses, where it undergoes air drying. Such work naturally falls to the housewife. The writer found an instance where several women were inoculated with anthrax consequent upon their handling the blood-stained cowdung of animals infected with that disease.

† Report of the Local Government Board, British Guiana, 1918 p 19

of the disease as compared with 1917, but there is no room for doubt, as foretold by Surgeon General WISE, that in the absence of very energetic measures to extirpate all fever, more especially in Georgetown, it must become a serious menace to the Colony —

1915	34 cases
1916	81 „
1917	444 „
1918	402 „

The report of the Registrar General of the Colony for 1918 shows that the total deaths from this cause were 127, of which 70 occurred in Georgetown. The measures pursued against the disease comprised —

“(1) prompt isolation of cases and removal to hospital, (2) disinfection of clothing and bedding, (3) inoculation of the members of the family and neighbours, (4) examination of convalescent cases in the Public Hospital, Georgetown for the presence of typhoid organisms in the urine or faeces, (5) improvement of the sanitary surroundings of houses in which cases occurred, (6) instructions to families in which cases had occurred as to precautions to be taken.” In regard to item (4) the Government Health Officer states, “of course a number of cases become chronic carriers and cannot be kept indefinitely, and it is probable that a certain number of recent carriers are also discharged as the bacilli may be discharged at irregular intervals there being long periods when no bacilli can be found.”

This does not sound very hopeful, nor is it, in effect, made more so by the summary of the influence at present exercisable under legal rulings by the Health authorities as given by Surgeon-General WISE. He states that they “continue to make efforts to induce* all patients to be isolated in this ward [isolation] in order to avoid the spread of infection which is believed to be chiefly by contact.”

A Nigerian proverb states that “it is the house owner who knows where the roof leaks”, the application of which is that British Guiana doubtless has reasons for not securing more drastic legal rulings than at present exist for protection of the healthy majority of its population against the typhoid carrier minority. Not only so but there is apparently no reason to regard general sanitary conditions as of a nature to put typhoid spread at defiance. In efforts towards control, the Health Officer records that 2,265 were inoculated against typhoid, of whom 80 per cent received a second dose. The vaccine was prepared by the British Guiana Government Bacteriological Department. The necessity for this measure is evident from the fact that of the total of 402 typhoid cases 41 per cent occurred between the ages of 6 and 15.

PLAGUE

BACOT in a paper which appeared in the *Journal of the Royal Sanitary Institute* of Sept 1919, makes the following remarks as to the position of fleas other than the *X cheopis*, whose rôle in plague transmission has long been fully recognized —

“There remains the danger of transmission by such fleas as the *Pulex irritans*, *Ctenocephalus canis*, *Ceratophyllus gallinae*, which although not rat fleas will attack these rodents readily, and if they are sick can do so with impunity, both the dog and fowl species will feed freely on man. As we have seen, both the human and dog fleas are proved carriers of pest bacilli and *Ceratophyllus gallinae* in all probability is equally as capable of carrying

*Italics not in original

the disease germs as it is willing to bite man. Provided that fleas of these species are sufficiently abundant during the course of an epizootic in which house or shed haunting rodents, such as mice, were involved, they might constitute a grave danger as transmitters to man. My view is that as possible factors in this respect these species have been rather overlooked.

The points to which he suggests the necessity for more notice than hitherto given must appeal to those dealing practically with plague. An attitude not unusual is, whilst recognizing such possibilities, to assume they are so remote in practice as to demand no attention. This however is not the way to deal with plague or any other disease of an epidemic type, where recognition and prompt stamping out of the first cases is essential. Here the sanitarian must be prepared in an enquiry as to origin not only to exclude commonly recognized factors, but also the theoretical possibilities. [To BACOT's remarks the writer would add the suggestion that the head louse also deserves more attention than is now given it, having regard to VERBITSKI's experiments, the fact that the head louse is universal in the lower orders in India, and that not simple removal from the head is practised—except by Jains who object to killing—but that extermination is effected by squashing *in situ*.]

In the same Journal, Dr A. G. R. FOULERTON makes the following remarks which contrast with the stereotyped views frequently held. He shows that it is possible to confuse an epizootic caused by microbes of the "haemorrhagic-septicaemic group" with genuine plague, seeing that microscopically specimens exhibit polar staining, and that these are Gram negative—rendering it necessary to determine the difference by cultural methods. As to plague transmission he holds that—

"the bubonic type of plague in man results from skin infection, whether after inoculation by flea bites or by contact with infected dust and dirt. There is not any doubt as to the dissemination of plague infection amongst men and amongst rats by their respective parasites, there is considerable doubt as to the exact importance of rat fleas in transmitting infection from the rat to man. On the other hand, it is obvious that with plague prevalent amongst rats and mice of a locality the opportunities of an indirect transmission of infection by means of infected food and dust must be very frequent by means of the latter, especially amongst bare footed Asiatics. Pneumonic plague is usually regarded as resulting from a direct infection of the lungs following inhalation of plague bacilli contained in small particles of sputum given off when a patient coughs. But, probably, the pneumonia of plague is usually secondary to a general blood infection resulting from swallowing plague bacilli, and not usually from inhaling them into the lungs. The pneumonic type of plague therefore is as likely to be caused by contaminated food as by direct inhalation."

TUBERCULOSIS IN INDIAN JAILS

The following extract from the Report by the Sanitary Commissioner with the Government of India, for 1917, shows that tuberculosis is an important factor in mortality in certain of the jails in India—

"Pulmonary tuberculosis was once more responsible for more deaths than any other single cause, to it was ascribed 19 per cent of the mortality from all causes. With the exception of Bengal, the United Provinces and the North West Frontier Province, the disease was somewhat more prevalent everywhere than in the previous year. The admission rate varied between 29.9 in the jails of Bihar and Orissa and 3.5 in those of the North West Frontier Province. The death rate attributed to phthisis

was highest in Bihar and Orissa 6.87, and lowest in the North West Frontier Province, 0.64. Burma, 6.37, and the Punjab, 6.35, returned death rates from this cause in excess of those of the previous year and of the mean rates of the previous decade.

"The prevalence of tuberculosis is one of the most unsatisfactory features of the Indian jails from the public health point of view. It is a matter that is receiving increased attention, and it is hoped that the measures now being enforced will result in considerable improvement within the next few years."

SMALL-POX

Small-pox Mortality at Age Periods

The population of Burma can be considered as but partially protected by anti-smallpox vaccination, the protective operation has however had sufficient influence upon child, as compared with adult, mortality from smallpox to demonstrate, as in the case of European countries, the fading influence of vaccination as age advances, and the consequent necessity for the practice of revaccination. Lt Col WILLIAMS, I.M.S., Sanitary Commissioner for the Government of Burma, in advocating revaccination has undertaken a careful analysis of statistics bearing on the above subject. He has dealt with statistics extending throughout fifteen years, in reference to mortality at age periods. The total deaths registered from smallpox during the period were 42,788. In a Note with which he has favoured the writer he states that the percentage proportions of the whole population, at each of the age periods, dealt with are as follows —

Age 0-1 — 3.63 per cent, 1-10 — 24.76 per cent, over 10 — 71.61 per cent

The percentage of mortality at the respective age periods was —
0-1 — 7.23, 1-10 — 22.97, 10-20 — 30.20, over 20 — 69.80

Glycerinized Vaccine

Dr BAYMA, Director of the Bacteriological Institute, and Dr MEDEIROS on the Staff of the Vaccine Institute of S. Paulo state that* they have received from time to time, from professional colleagues, complaints that tubes of lymph from the Institute have been partly filled by perfectly limpid and transparent glycerine, showing no macroscopic evidence whatever of the presence of vaccine lymph. This has led them to distrust these tubes or at any rate the part containing clear glycerine as likely to lead to lack of success in vaccination. The authors admit that one at least of them shared this view at first. The fact, however, that the vaccine virus is ultra-microscopic and filtrable led them to doubt its soundness, and a series of experiments with glycerine which had not been triturated with vaccine lymph but had merely had some of the latter immersed in it and remained perfectly clear and limpid, completely confirmed their doubts and proved that simple immersion of vaccine lymph in glycerine confers on the latter vaccinal virulence.

* BAYMA (Theodor:) & MEDEIROS (Alfredo). Poder vaccinante da glicerina após contacto como Cow pox. (Diffusão do vírus antivariceloso na glicerina). Nota Preliminar. [Vaccinal Power of Glycerine after Contact with Cow Pox. Diffusion of Anti-Varicelous Virus in Glycerine. Preliminary Note.]—*Ann. Paulist. Med. e Cirurg.* 1918, May, Vol. 9, No. 5, pp. 97-100. With 5 Plates.

The authors' conclusions are stated as follows —

1 Glycerine, after contact with cow-pox, possesses the same vaccinal power as the latter in virtue of the diffusion through it of the Cow-pox virus

2 Inoculated into human beings and receptive animals this glycerine causes the formation of vaccine vesicles similar to those caused by the direct inoculation of lymph

3 The inflammatory symptoms caused by the inoculation of virulent glycerine are much less intense than those due to the inoculation of lymph properly so-called

4 Further researches may show the advisability of employing virulent glycerine in vaccination in place of the ordinary vaccine lymph *

[The question raised apparently is whether in the absence of particles of vaccine pulp, vaccine lymph contains more or less vaccine virus. The authors are apparently not aware that before the introduction of the employment of the pulped vesicles of calves inoculated with cow-pox, it was customary to use the clear lymph extracted from vesicles by pressure and mixed with glycerine—at first for purposes of dilution in the interests of economy and latterly of preservation.]

The "Mulberry Reaction" in Vaccination

The Report of the Director-General of Public Health, New South Wales, for 1913, contains a special Report by Dr ARMSTRONG, Senior Medical Officer of Health, and associated officers,† which enters very fully into the nature of the "mild form" of smallpox frequently known as the American type. The disease was introduced into Sydney *via* Vancouver. Altogether, there were 1,073 cases with only one death, even in this case the parturient condition of the subject presumably aggravated conditions. The first cases occurred amongst the unvaccinated, who suffered so little from constitutional symptoms as to render diagnosis a matter of doubt, but the identity of the disease with small-pox was fully established. The Report states, "The crucial test of the identity of the two forms is however to be found in their immunity relation. Persons who have had smallpox or who have been successfully vaccinated are at least as immune to the mild as to the severe type. It is also found that persons who have had the mild type are equally immune to vaccination." Notwithstanding the general mildness of the constitutional symptoms, the amount of skin eruption was at times very considerable, one case is quoted in which there were 4,000 pocks upon the surface of the whole body—of which 362 were on the face. In regard to the protective power of vaccination, it is stated —

"It was found that, with two doubtful exceptions, no person who had been successfully vaccinated during the course of the epidemic, afterwards contracted small pox. By this one does not mean to say that no person who had undergone the operation of vaccination afterwards contracted small pox. On the contrary, this happened in sixty one instances. But with the two doubtful exceptions above referred to, in all the sixty one instances the vaccination had either been followed by no reaction whatever (thirty nine

* Summarised by Dr F S ARNOLD

† Dr J BURTON CLELAND and Dr E W FERGUSON, the Principal Microbiologist and Assistant Microbiologist, respectively

cases) or had resulted in the aberrant reaction which Scheult has christened a 'mulberry' (twenty one cases) a reaction which, when it follows in a person who has not already had small pox, appears to be due to defective lymph. A vaccination followed by this reaction does not afford protection against subsequent vaccination or small pox."

Virulent Small-Pox

Dr STRATHAIRN, Ag Principal Medical Officer, Uganda Protectorate, in his Annual Report for 1918, notes in connection with food scarcity conditions (following shortage of crops owing to drought) that an epidemic of small-pox then incident upon the population was favoured in attaining virulence and spread owing to the lowered vitality of the people. A similar result was recorded during the Franco-Prussian war (PRINZING).

"Dr Collyns, the Medical Officer of Health at Kampala, who was responsible for controlling the outbreak of this disease around the K A R Headquarters at Bombo, calls attention to the severity of the type experienced. The disease at its height was of a virulent type and one particular form in which the pocks were hard, flattened, and scaly, not proceeding to suppuration and generally covering the whole body was almost invariably fatal. This form was called by the natives '*Kawali wa Mbajwe*'."

[This description of *Kawali wa Mbajwe* conforms with the malignant form of small pox described by RHAZES.]

VARICELLA

It is recognized that during an epidemic of small-pox there may occur an exacerbation of its virulence. W STOELZNER (quoted by the *Bulletin de l'Office International d'Hygiene Publique* (p 1344, Vol 11, No 12) holds that this was a feature of a varicella epidemic at Halle, during the war. The constitutional symptoms acquired increased severity, whilst the vesicles approached more nearly the character presented by variola, scars also were not uncommon.

BERIBERI

The Director, Medical Services, India, in his Report embodied in that of the Sanitary Commissioner with the Government of India, for 1917 (p 29), refers to an outbreak of beriberi amongst the Indian troops stationed at Quetta, where 40 cases occurred with 4 deaths. It was found that the troops were using a "whole rice ration." The rice on examination was found to be of poor quality as supplied by the Supply and Transport Corps, after it had been duly passed by a Committee of Indian officers. The outbreak "was stopped at once by (1) change of ration from whole rice to one third atta, (2) the issue of extra vegetables, milk and meat to the affected units for one month."

Fired Diets

The Director Medical Services, India, in his Report for 1917 (embodied in that of the Sanitary Commissioner with the Government of India) draws attention to the fact that in special Army Orders issued in that year all combatant ranks of the India Army, except when on furlough and on leave, are entitled to the issue of the following ration

Atta [wheat flour] or rice $1\frac{1}{2}$ lb Dal [legume] 3 oz , Ghee [clarified butter] 2 oz , Goor [crude sugar] 2 oz , potatoes 2 oz This ration is supplemented by a monetary allowance of As 10 per month per man Under a further Army Order, Generals commanding Divisions and Independent Brigades may issue extra rations for 30 days at a time "to Indian troops, who are in receipt of free rations, in special circumstances, e g , hard work, or exposure to severe weather" This delegation to local authority of the right to alter diet within certain limits, will go far towards preventing the appearance of beriberi from time to time at certain stations The permission to issue rice or wheat flour as if one were the equivalent of the other in nutritive power, is however both financially and from a nutritive point of view open to criticism It is reminiscent of Indian Famine Code methods, by which a mere sustenance diet given in one part of India, when afforded in the shape of a millet or rice, may fail in its object when compared with results secured in another part of that country, by issue of wheat as the staple of the diet The contrast in nutritive value of wheat and rice was fully entered into by Major McCAY, I M S,* and his principles have been steadily enforced with good results in the Jails of Bengal by Sir William BUCHANAN, I M S The latter officer, in his Report on the Jails of the Bengal Presidency for 1918, shows the following contrast between prisoners who voluntarily adopt the so-called Bengal diet where the staple grain is rice, and the wheat rice diet where a better proportion of proteid and carbonaceous constituents is secured The following table shows that of the prisoners on wheat scale diet not only did a greater proportion gain weight and a less proportion lose weight, but the incidence of bowel affections was less among those on wheat diet —

	Gained weight	Lost weight	Bowel complaints
Bengal diet	.51 56 per cent	23 10 per cent	25 90 per cent
Wheat rice diet	56 36 „ „	20 84 „ „	18 13 „ „

SCURVY

In the Northern Frontier District of the East African Protectorate in 1918† there occurred 203 cases of scurvy with 16 deaths

"The treatment of this preventable disease was much hampered by the difficulty of growing vegetables and the absence of sea transport to bring in fresh supplies The outbreak was finally controlled by the importation of a large consignment of green coco nuts from Zanzibar on the suggestion of Dr E Dias"

FOOD

Cyanogenetic Beans

Much discussion and unnecessary commercial harm has, from time to time, arisen as to the presence of prussic acid in beans So far, the belief has been that when the rare occurrence of undesirable amounts has been ascertained by its effects on animals, it has been due

* Scientific Memoirs by Officers of the Medical and Sanitary Departments of the Government of India (New Series No 48 1911)

† An Med Report East Africa Protectorate, 1918

to the use of the red bean and that here the inclusion of the uncultivated variety was the cause of the trouble. The following statement by the Imperial Agricultural Chemist to the Government of India (W. H. HARRISON, D. Sc.) shows the present position of the subject, as stated by him in the Report of the Board of Scientific Advice for India, 1917-18 —

"Arising out of complaints regarding the poisonous character of occasional cargoes of Burma beans (*Phaseolus lunatus*) Warth and Ko Ko Gyi have carried out an important investigation regarding the occurrence of prussic acid in them and the results obtained have been embodied in a Departmental Bulletin. Their general conclusions are — (1) The prussic acid content is an inherited character of pure plant cultures and these cultures may be multiplied and will maintain the difference noted. (2) Cultures giving low values in one locality give low values under all the conditions tested. (3) The prussic acid present in the cultures varies considerably according to the soil and climate.

"The main fact brought out is the possibility of isolating less poisonous strains by chemical selection and in fact the best cultures hitherto obtained contain only one half of the prussic acid contained in the original sample of Madagascar bean imported into Burma as safe for human consumption."

Obviously, the Burma beans contain less prussic acid than those offered in the market by Madagascar. It may be stated that beans in Burma are largely used not only in jail diets, but also by the free population and that no instance of cooked beans having any ill-effect on men is on record, the white beans are those favoured.

The Director Imperial Institute, in the Report quoted (p. 65) gives further information on this subject as follows —

"The following samples of beans from Burma were forwarded by the Director of Agriculture, Northern Circle, Burma, for examination at the Imperial Institute in continuation of previous investigations.

(a) Bo sa pe apyu beans grown experimentally on the Mandalay Farm, Burma, were found to have a high food value, being rich in protein and similar in composition to haricot, and Madagascar beans. These beans contained no cyanogenetic glucosides. Their nominal value, under Government control, was estimated at £36 to £37 per ton c.i.f. London (March 1918).

"(b) Samples of Pe nge beans representing the second and third years' crops at Natywagon, and the first and second years' crops at the Mandalay Farm, were examined in order to determine the amounts of prussic acid which they yielded. The percentages were found to be satisfactorily low in all the samples. The beans were of good colour and appearance and would be readily saleable in large quantities at the controlled price of £42 per ton c.i.f. London (March 1918).

"(c) Samples Pe byu glay beans gave yields of prussic acid which were undesirably high but would not in view of past experience be considered dangerous to cattle."

Milk and Bovine Breeds

"The supply" of uncontaminated milk does not end the interest of the sanitarian in dairies, a milk that will yield a high percentage of fat may be to him a desideratum in the interest of the food supply of a locality. To the vegetarian Indian who looks largely to clarified butter for his food fat, the yield of cream is of moment and presents itself to him as a forcible argument in selecting animals for milk supply. Whilst for use in various food preparations the milk of the cow is preferred, he trusts chiefly to the buffalo for his "ghee". The richness of yield of fat in these animals is remarkable, and this applies also to various breeds. The following gives a comparative analysis of milk

derived from indigenous cows of seven selected breeds in the Madras Presidency, as carried out by Dr LEATHEP,* Agricultural Chemist, Govt of India. The butter fat per cent differed as follows — 4 41, 5 45, 6 07, 4 57, 3 52, 4 62, 4 44.

Much work in this direction has been fulfilled by Mr LEVINE, B S, Instructor in Animal Husbandry and Dr CADBURY, College Physician, Canton, by whom a paper containing much information on the subject was contributed to the *China Medical Journal* of Nov 1918. This has now been followed by a further paper by Mr LEVINE in the *Philippine Journal of Science* of July 1919. In the latter, the milk of buffaloes as found in various countries is thus stated† —

Constituent	Southern China	India*	Philippine Islands†	Italy*
Fat	12 60	7 95	6 84	7 99
Protein	6 04	4 00	4 97	4 13
Sugar	3 70	5 18	5 16	4 75
Ash	0 86	0 78	0 83	0 97
Water	76 80	82 09	82 20	82 16

*Bailey's Cyclopaedia of American Agriculture 3 (1908) 295

† Philippine Agriculturalist and Forester 6 (1917) 110

Analysis of the milk of cows of different breeds is also afforded

Constituent	Canton buffalo	European cow Canton	European cow America	Yellow cow
Fat	12 60	3 80	3 69	8 00
Proteins	6 04	3 23	3 53	—
Sugar	3 70	5 96	4 88	—
Ash	0 86	0 82	0 73	—
Water	76 80	86 20	87 17	—
Total solids	23 20	13 90	12 25	—

[Numbers give percentages]

It will be noted that the yield of fat in the "yellow cow" is large, and it would seem likely that certain cows indigenous to parts of the tropics might with advantage be crossed with the breed. Mr LEVINE gives the following description of the animal —

"The Chinese in South China call the native cow *wong ngan*, 'yellow cow'. This bovine is a variety of the Humped species of cattle (*Bos indicus*) common in the Orient. The hump is much less pronounced than it is in most breeds of Indian cattle. In the males the hump is usually 6 to 8 inches high above the shoulders. It is much smaller in the females than in the males. The dewlap is large, but is not developed to

* Report of the Dept. of Land Revenue and Agriculture, Madras, for 1899-1900

† The percentage of fat given for the Indian buffalo in this analysis is below that usually credited, namely 9 per cent

the degree common in Indian cattle. In color, these native yellow cattle are similar to the Jerseys. They vary from yellow red to brown black. Many are brindle. There are no white, and very few spotted, individuals. The tongue, nostrils, and teats are black. The cream colored ring above the nostrils in the Jersey is also a characteristic of these cows. Males weigh from 800 to 1,000 pounds (about 362 to 454 kilograms). Mature females weigh from 600 to 800 pounds (about 272 to 362 kilograms). Their milk is considerably richer in fat than is that of any European breed, though not so rich as is the buffalo milk. The amount of milk given is usually about the same as that given by the buffalo cows, or a little less. They have a full, deep quarter and a deep layer of meat on the loin and back. They are used chiefly for draft and beef purposes. They are gentle, and much easier to handle than are the buffaloes. Very few are milked."

In the paper written for the *China Medical Journal* above quoted, a useful comparison is made when substitution for human milk is contemplated. [In India, the animal is frequently so filthy a feeder that nothing but dire necessity would induce a European mother to employ buffalo's milk for her infant.]

'Mother's milk compared with Canton buffalo milk modified by the addition of water and sugar. For every 100 grams milk 18 grams sugar and enough water should be added to make 300 grams —

	Mother's milk	Buffalo milk
	Per cent	Per cent
Fats	4.00	4.20
Sugar	7.00	7.20
Proteids	1.50	2.01
Ash	20	28

Simpler measures to use would be ten ounces undiluted buffalo milk, 1½ ounces of sugar, and enough water to make 30 ounces."

WATER

Purification of Public Water-Supplies

This question has been for some time made a special study by the Director, Dr GIBSON, King Institute, Madras, and the Sanitary Engineer to Government, Mr HUTTON, with special reference to tropical conditions. The Sanitary Commissioner with the Government of India gives the following summary of work in this direction fulfilled in the Microbiological Section during 1917 —

A large amount of useful work was carried out during the year. Researches in connection with sand filtration of water were continued and the great value of sedimentation antecedent to filtration, in the case of highly polluted river waters, was demonstrated. Storage in sedimentation tanks for periods from four to eight days was found to bring about a ten thousandfold reduction of lactose fermenting bacteria. Moreover pre-sedimentation greatly increased the efficiency of the filters, the life of which were considerably prolonged thereby. The experiments indicate that two feet of sand is the thinnest layer that should be employed, if less than this be used difficulties are experienced with the filtering skin. With pre-sedimented water, and with depth of sand of not less than two feet repeatedly successful results were obtained with filtering heads up to thirty six inches.

Colour of Water in Relation to Purity

"Indian Engineering" (Calcutta) of Feb 7th, 1920, in a leading Article, refers to facts brought together in an investigation by W D BANCROFT, Professor of Chemistry, Cornell University, U S A , on the above subject. The following extracts are of sanitary interest, and may in the future lead to tests which may prove of practical importance —

'The sky itself is not a pure blue, for if seen through the spectroscope all the colours of the spectrum are seen, only blue predominates and hence the effect on the eye is blue. The opinion is expressed that were water of uniform density and perfectly free from suspended matter, it would scatter no light at all, the track of luminous beam could not be seen in such water. But an amount of impurity so infinitesimal as to be scarcely expressible in numbers and the individual particles of which are so small as wholly to elude the microscope, may, when examined by illumination by a powerfully condensed beam, produce not only sensible, but striking effects on the eye.

"Mr Bancroft picked up samples of sea water from a great many positions, 19 in all, between Gibraltar and Spithead, put them in special bottles and noted their peculiarities, such as colour of the sea at the spot and appearance in a luminous beam distinguished as—'thick with fine particles', 'very thick', 'very little matter, pure,' 'a good deal of matter,' and so on. It was then established that the green colour went with fine suspended matter and ultramarine colour (and more especially the black indigo hue of the Atlantic) with the comparative absence of such matter. Where therefore the water is very deep and very pure, all the colours are absorbed, and such water appears black as no light is sent from its interior to the eye. The approximation of the Atlantic Ocean to this condition is an indication of its extreme purity.

"As the deep blue colour of the Mediterranean has always been a subject of remark, Mr Bancroft gives it some consideration. The geological formation of the shore, in fact, has a strong influence on the colouring of the water. Thus, off Mentone, where limestone is abundant, the sea is much more brilliantly coloured than off Cannes, where there is little limestone and the shore is covered with sand, the *debris* of the surrounding rocks.

"There is a way given of obtaining distilled water, developed by Stas which it is believed produces a pure water, and Mr Bancroft has tried it and vouches for it. Briefly, ordinary water was first boiled with alkaline permanganate for four hours in a glass vessel, it was then distilled twice in a platinum apparatus and collected in a closed silver flask out of contact with the air. Such water can be evaporated without the smallest trace of a residue. He says—'When this pure water was poured into tubes it is hard to describe the purity of the blue colour which was seen. The only thing that could be compared to it is the most beautiful blue of the sky on a clear day at the top of a high mountain where one is far above the mists rising from the ground.' It is emphatically stated at the same time that the inherent blue colour of water is not sufficient to account for the blue colour of the Atlantic, the Mediterranean and certain lakes. Water will absorb all the components of white light in time. The red, the orange, the yellow and the green disappear successively and finally the blue when the thickness of the layer is sufficient. The light of the sun would therefore be absorbed completely in absolutely pure water if the water were deep enough. Such water would therefore appear as black as ink when over 200 metres deep. In short, Mr Bancroft says—'The much admired dark blue of the deep sea has nothing to do with the colour of water, but is simply the blue of the sky seen by reflection. When the heavens are overcast the water looks grey and leaden, and even when the clouding is partial the sea appears grey under the clouds, though elsewhere it may show colour.'"

Silt-laden Water

From a Reprint of a paper by Govinda RAJU, B A , Bacteriological Assistant to the Sanitary Commissioner for Bengal, which appeared

in the *Indian Journal of Medical Research* of April 1919 (Vol 6, No 4), the following extracts are made. It will be seen that Mr Govinda RAJU has undertaken a very useful experimental enquiry into the limits of utility of alum for treating silt-laden waters.

"A fixed quantity of this mud emulsion was added daily to a fixed quantity of Calcutta filtered water sufficient to render the water highly turbid, and the resulting turbid water then allowed to settle for a day. After settlement the amount of suspended matter that remained in the water was estimated by weight. The results show clearly that, when the alkalinity is high, practically the whole of the mud added is precipitated, but that, when the alkalinity is low, the water continues to be turbid and contains 18 to 22 parts of suspended matter.

"When the alkalinity is about as high as, or higher than, 20 parts per 100,000, the whole of the suspended matter is precipitated and the water remains colourless and clear. Not a single exception to this rule has so far been met with, although a number of hard waters from several districts of Bengal have been examined. Between 1 to 7 parts per 100,000 of alkalinity there is generally a progressive decrease of suspended matter as the alkalinity increases. Distilled water retained the largest amount of suspended matter. When the alkalinity ranged between 1 to 3 parts per 100,000, the suspended matter varied between 30 to 40 parts, when the alkalinity was between 4 to 7 parts, the suspended matter was anything between 18 to 24 parts, when the alkalinity was about 10 parts, the suspended matter fell to 4 or 5 parts, and when the alkalinity was higher than 15, practically the whole of the suspended matter was precipitated, only 1 or 2 parts being left, which imparted to the water only a slight haziness.

"The above results illustrate in a striking manner the influence which the alkalinity of a water exerts on the amount of suspended matter present therein. The importance of this finding lies in the fact that it furnishes us with a means of foretelling the amount of clarification that would take place when a turbid water is allowed to settle for a short period of time, as is generally done in waterworks. For instance, in the present case, namely that of the Hooghly water, we know that when the alkalinity is about 17 parts per 100,000, a day's settlement would be sufficient to cause to precipitate almost the whole of the suspended matter present in the water, while a similar period of settlement would leave a softer water with an alkalinity of 6 or 7 parts quite turbid. It is easy to see the value and the practical application of results such as we have described."

The use of alum for precipitation of solids held in suspension in water is probably of ancient origin. Its employment for this purpose has long been exercised by both Hindus and Burmese. In certain areas alum is used in the form of blocks over which water on entrance flows for storage. The principle of precipitation is also recognized by the use of the fruit of the *Strychnos potatorum*. Here the berry is rubbed on the inside of jars into which it is intended to introduce the water, just as in the case of the hydrate of alumina formed by use of alum, there results a mucilaginous looking mass which as it descends to the bottom entangles suspended matter. In camp life dealing with silt-laden water by the alum process is a simple and satisfactory procedure.

When river transport is employed, the man on tour, who does not desire to adapt himself to geophagism, can arrange to have one or more earthen jars filled before sundown and will find a clear fluid by sunrise awaiting the further treatment of filtration and subsequent boiling. In taking water from such rivers, it is well to choose the centre of a stream and not the neighbourhood of the banks. Whilst the carefully ascertained data presented by Mr Govinda RAJU will prove of value in determining with accuracy requirements, a rough

and ready method is to employ one grain of lime in the first place to the gallon of water, and follow this by alum up to 3 grains per gallon. In the Madras Presidency the writer employed alum with much benefit for purification of tanks used for bathing purposes at Hindu festivals. There is nothing suggestive of "pollution" in alum, and it is both cheaper and less likely to be objected to than permanganate of potash with its suspiciously red colour. It is true entanglement and precipitation of microbes does not imply disinfection, but there is evidence that at least inhibition of multiplication may occur, be this as it may, whilst a sacred bathing tank without such purification soon is churned into a mass of filthy water, under application of alum it was possible to keep such tanks with a visible bottom and clear supernatant water. The process followed was to compute the cubic feet of water within twenty-five feet of the banks, and to place the necessary quantity of alum in gunny bags attached to light rafts which were drawn or poled throughout the space, till the contents were dissolved. As this was done at night time, there was gained time for settlement of the water before it was used on the following day.

The Excess Lime Method

For treatment of the water supply of Accra there were installed, as part of the original waterworks scheme, Peuch-Chabal filters. The use of these filters is but little practised in England, and it may therefore be stated the system contemplates the passage of water through successive filters in which the material is graduated, so that the last passage is through a filter of the finest grade. The instalment was soon found unsuitable for the requirements of the Accra water. Dr ALEXANDER* (Senior Sanitary Officer, Gold Coast Government) now states that, acting on a joint Report by Professor SIMPSON and Dr HOUSTON "the excess lime process" as advocated by the latter authority was adopted. A local Committee undertook experiments on the subject and has now reported as follows —

"The members were unanimously of the opinion that the results of the experiments undertaken by them 'demonstrated that the Excess Lime Process was capable of freeing the water supplied to Accra from bacillus Coli and rendering it epidemiologically safe whilst at the same time bringing it up to the standard required chemically and leaving little to be desired from the point of view of taste and visibility'. Weekly bacteriological examinations of samples from the final filters and from a standpipe or fountain in the town were instituted, and the results remain uniformly good."

THE DISEASES OF DOMINICA

The sanitarian may evolve schemes that will bear criticism not only by his professional brethren but by the "practical man" of Local Bodies in command of finance, to carry these out efficiently and economically however he must look to technically well-trained and disciplined subordinates to supply him with numerous details. In economy of numbers of such staffs, much may be accomplished by both the sanitarian and his subordinates being mounted or supplied with motor vehicles of sorts (to which perhaps in the near future may be added aeroplanes for inspection during epidemics).

*Medical Sanitary Report, Government of the Gold Coast, 1910

where large tracts of country are concerned) but, without their aid, he must inevitably find himself in the position of a General without an army—and be of just as much utility to his country. Here is a statement on the subject by Dr H. Alford NICHOLLS, C.M.G., in his Report on the Roseau Hospital, Dominica, for 1918-19 —

“As I pointed out in my last Report, an educated Sanitary Inspector is greatly needed to place the sanitation of the chief town of the Island on a satisfactory footing. This important matter received the attention of the Government and the Chairman of the Town Board of Roseau during the year, and it is hoped that in time measures will be carried out to safeguard the urban population against the preventable diseases that not infrequently are prevalent.” He *inter alia*, shows that the inhabitants of Dominica suffer from dysentery, malaria, leprosy, yaws and tuberculosis. As to venereal diseases, he states — “Syphilis is undoubtedly on the increase in the Island. Some of the old neglected cases of tertiary disease that came into hospital were terrible examples of destructive specific ulceration. Gonorrhoea of a peculiarly virulent type was prevalent amongst the lower classes of the people.”

CLIMATE OR FAULTY ENVIRONMENT

M. L. D'ANFREVILLE* writing in the *Bulletin de la Société de Pathologie Exotique* states that Casablanca contains more Europeans than any town in Morocco, and is the port by which almost all travellers enter that country. Of the 42,000 “Europeans” about half are French (Algerians, Tunisians, etc.) and 500 British, chiefly natives of Gibraltar. Meteorological tables for 1918 show the humidity, rainfall, average temperature, with maximum and minimum, for each month. The climate is trying owing to the high humidity, but it has been noticed that races from South Europe stand it much better than those from the north or west. Though there is abundant building space, speculation in the early days had the result that the houses in the European quarter are for the most part very small, and so crowded as to be very insanitary. There is a vast network of sewers and a good supply of pure water.

Tables of vital statistics for the natives, and for the French, Spaniards and Italians are given for a series of years. In 1918, the native mortality was 48.5 per mille, the figure for Europeans being 15.4 (French 11.7, Spanish 24.0). The infantile mortality was 279 (French 229, Spanish 311). Typhus and plague have been successfully combated, and malaria is much less prevalent than it was. [With such mortality rates, Casablanca presents a field for sanitary effort.]

“CARRIERS”

At no time has the position of “disease carriers” been of more world-wide importance than at the present, having regard to the aftermath of the great War. Had medical science at the date hostilities commenced been of the type existing in 1870, there undoubtedly would have occurred epidemics of malaria, typhoid, typhus, trench and relapsing fevers, which would have caused the mild term epidemics to have been replaced by use of the old conception of “scourges” of mankind. In Great Britain from the opening of

* *Essai sur la Climatologie et la Démographie de Casablanca* — *Bull. Soc. Path. Exot.* 1919 Oct Vol 12 No 8 pp 525-530

the War up to date, the possibility of "carriers" proving important factors in disease prevalence has been met by persevering efforts by both War Office and the Civil Departments under the advice of Sir Alfred KEOGH, Sir Arthur NEWSHOLME, and their successors respectively. The work fulfilled has been so void of "fuss" and advertisement that very few of the laity have had the slightest conception of the various ways and means employed to deal with the problem.

America and Australia also have not failed to pay attention to the subject. In the Annual Medical Report (Dr A. D. MILNE, P.M.O.) for the East Africa Protectorate for 1918, the matter is thus alluded to — 'The return of a large number of discharged soldiers and carrier corps porters had, and is having, an inevitable effect on the country, this in spite of the most admirable medical work of the carrier corps. It was not possible for the civil department to take over the segregation of disease 'carriers'. Thus it was that various diseases became prominent.'

RURAL SANITATION

However willing the men of "light and leading" in a rural population may be to adhere to sanitary rulings, there will always be found a proportion of village inhabitants—for reasons that may be merely quaint or the outcome of deliberate opposition to any restraint of long pursued and insanitary habits—who will set at naught the most mildly conceived laws. Hence a sanitary ruling without a punishment judiciously fitted to an offence, is of no utility within a few days of its promulgation. In the absence of the advisability of hard and fast laws where primitive races are dealt with, much good can be effected on the *ante non vi* principle. Kamaing, Upper Burma, is a notoriously malarious place and is too small to approach to the dignity of a Municipality. The Sub-Divisional Officer (C. W. KING) has put into force a scheme which gives promise of working well. He has inaugurated a "Public Health Society" which includes 150 members. Each member subscribes 2as monthly. To each ward village an Elder is appointed. This man inspects the condition of houses and premises in his area once weekly. Marks are then assigned to each householder, in accordance with the sanitary conditions found. Each month the Members of the Society meet, and the question of the connection of mosquitoes with malaria prevalence is explained and other disease tendencies amongst the population are also discussed. At the end of the year, the money collected will be awarded in accordance with the number of marks gained. The Members are expected to keep their houses and premises clean, fill up all hollows, remove all pools or regularly oil them with kerosene, and keep all jungle cut down. The author of the scheme states —

"I found that it was of no use trying to get the people for their own sakes to keep things sanitary, so I had to appeal to the instinct of monetary gain which is common to most sorts and conditions of men, and through this means to cause them to favour sanitation unconsciously. When the people hereafter find that they possess better health than previously by following the principle of 'prevention is better than cure,' I have no doubt they will be sanitary for their own sakes."

So far the experiment has worked well, and there is already an appreciably less prevalence of malaria.

AN AUTOMATIC FLY TRAP*

A most successful form of Fly Trap and veritable fly-killer was much used in and about camps during the recent campaign in Mesopotamia, the clever invention of S Sergt H J KARSLAKE, 100th Sanitary Section, R A M C

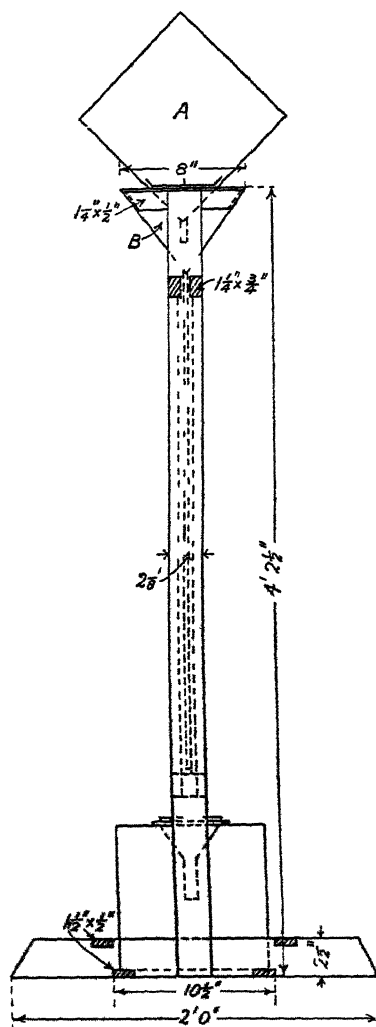


Fig 1 End elevation

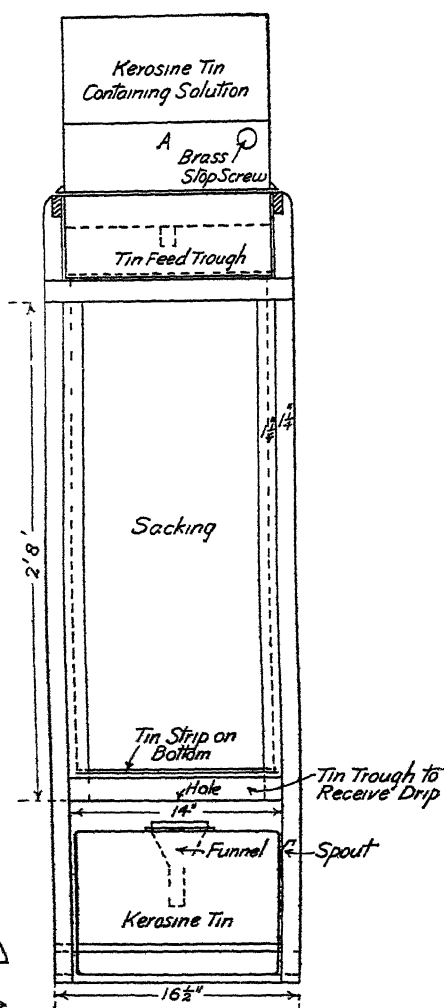


Fig 2 Front elevation

Automatic Fly Trap (scale 1 in = 1 ft)

Though arsenic, which is the lethal weapon in the trap, has been stated by some to be too dangerous to be used in fly traps placed in and about kitchens owing to food contamination from flies migrating on to food supplies from the traps, yet no cases of arsenical poisoning have been traced to this cause

* Communicated by Dr Ralph De Veil KING (Captain, R A M C, Ret)

Indeed it is said by those who have had long experience with the trap, that if the arsenic solution is used strong enough the fly migrates only a very short distance, about 3 or 4 feet from the trap, before it dies

The solution commonly used was —

Arsenite soda	lb 1
Sugar	lbs 10
Water	gals 10

It was found that if beer be used instead of water, the solution was more attractive to flies

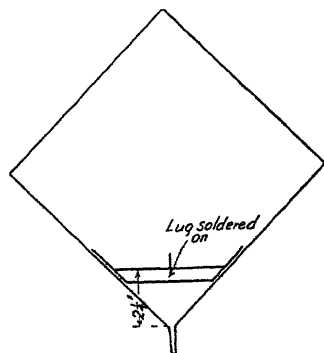


Fig 3

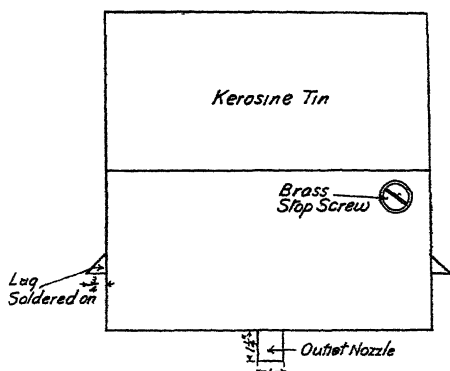


Fig 4

Details of Kerosine tin (A) containing solution

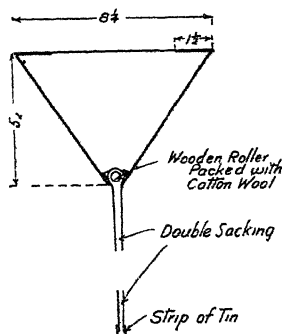


Fig 5

Section through
tin feed trough (B)

The mechanism of the trap is as follows —To the lower quarter (Figs 1 & 2) of a kerosine oil tin a lug is soldered in such a position that the tin can rest diagonally in the required position on a funnel-shaped trough

The tin is provided with an opening through which the solution is poured, and acts as a cistern. The opening is closed by a well-fitting and *perfectly* air-tight screw cap

That portion of the tin which dips into the trough below is provided with an opening for the fluid, to which is soldered a short spout (Figs 3 & 4)

The trough below the cistern consists of another kerosine oil tin which has been cut diagonally so as to form a V, and the base of the V is opened sufficiently wide to admit of resting within it the width of a wooden roller (Fig 5)

On to the wooden roller is placed a double layer of sacking 2 ft 8 inches in length secured at the lower end by a tin strip to the framework of the trap

The lower end of the sacking is placed directly over a V trough in which a small hole is bored, and which receives the drip from the sacking. The drip is collected below this hole by a wire gauze-covered tin funnel (Figs 6 & 7) which latter conveys the strained drip to another kerosine oil tin for the purpose of using the solution over again. In order to set the trap working the cistern is filled with the arsenical solution and the upper trough is filled with the same solution till it rises just above the level of the spout of the cistern. The sacking must previously be well wetted.

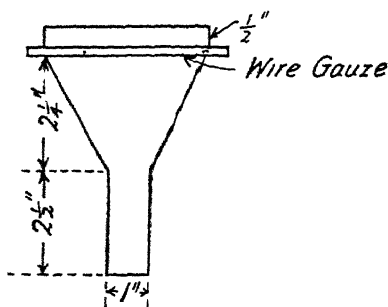


Fig 6

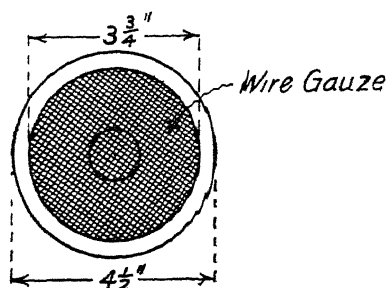


Fig 7

Details of funnel

The arsenical solution in the trough will slowly by gravity and capillarity moisten the sacking, and when the solution in it falls lower than the level of the spout of the cistern, some of the solution will flow from it into the trough until atmospheric pressure is again balanced.

Hence, the perfectly tight fitting screw, which is an essential part of the cistern, will prevent air leakage and a too rapid flow of solution from the cistern into the trough.

The construction and details of the trap may be found on the diagrams.

PRICKLY PEAR

In this *Bulletin* (Sanitation Number) Vol 14, No 6, Dec 15, 1919, the subject of destruction with due economy, of that well-known sanitary pest of many tropical villages—prickly pear—was entered into with special reference to commercial possibilities. Amongst other authorities quoted the Report of the Queensland Prickly Pear Commission was referred to. Much work had been done by it, but the great war unfortunately put an end to its labours, at a period when it had been determined to put into effect numerous experiments of probable practical utility. More light is now available on this subject by reference to a paper by C P LOUNSBURY, Chief, Division

of Entomology, Department of Agriculture, South Africa, which was published in the *Agricultural Journal of South Africa*, in June 1915. The author of the paper quotes the Records of the Botanical Survey of India Vol No 6 of Oct 1911 as follows —

“The wild cochineal insect introduced into India in 1795 spread so rapidly on *Opuntia monacantha* as to destroy it, branch and root, out of the countryside. The insect was introduced into both Bengal and Madras but owing to the action of the Government of Madras in encouraging its propagation it spread more rapidly there than in Bengal. It had almost done its work of destruction in Southern India in twenty years, but in the north it took sixty years to travel from Calcutta up to the Ganges Valley and over the Punjab Plain to Ludhiana—rather more than 800 miles away. Its progress through Bengal is unrecorded, but the *Opuntia* had become a pest in the Punjab, and its destruction made such a difference to the face of the country that writers promptly noticed and recorded what was happening.”

From this, it would seem probable that it was not the *Grana fina* of commerce but the *Grana sylvestris* which was introduced into India and forthwith proved deadly to the “straight-thorned opuntia while the *Cactus tuna*, or awl thorned opuntia remained untouched by the insect.” Both WILKS in his history, from which a quotation was given in the *Bulletin* above mentioned, and Mr LOUNSBURY identify the variety of prickly pear by the nature of the thorns on the leaf, whilst writers on the subject in India have held strong views as to the red or the yellow flowered opuntia being that which is or is not vulnerable to the insect, according to the respective views supported. In an official correspondence which was published for general information by the Madras Government (in reply to the reference started by the writer in 1895–96), the following extract from a letter by Sir George WATT shows that the whole subject is involved in much doubt, and as he then advised, was well worthy of being fully investigated —

“There are said to be two forms of the Cochineal insect known as the *Grana fina* and *Grana sylvestris*, whether these are distinct species or the one only the wild state of the other cannot be said even now to have been definitely settled. In 1795, Captain Nilson introduced the *Grana sylvestris* or wild insect into India, and that insect partly because in trade it is spoken of as wild or inferior insect and partly because of its complete acclimatisation is sometimes called by Indian writers the ‘indigenous insect.’ This is of course a mistake, since not only is it not indigenous, but no species of cactus was known in Asia prior to the discovery of America, so that the food plant not being indigenous the cochineal insect cannot be admitted to having any claim to being so. It is probable also that some form of cochineal insect may have been in India prior to the first recorded importation in 1795 since the opuntia (cactus) or prickly pear had no doubt been introduced long anterior and probably as a fruit tree. It is customary however to read of the cochineal insect in one district being good, in another bad, and this may possibly be the result of different races having been brought to the country or developed during acclimatisation, if it be not the case that we have both the *Grana fina* and the *Grana sylvestris*.”

Under these circumstances, the Cape Government was fortunate in securing a species of cochineal insect from India which seems to possess highly destructive powers, as shown by the following account by Mr Lounsbury —

“The Indian species has a pronounced blighting effect that is quite in contrast with the comparative harmlessness of the Cape species. Where it settles, the new growth of the plant becomes contorted, yellow blotches appear, and as the attack continues the joints wither and decay. Young plants three or four feet high die in a few months.

"The Indian cochineal has been propagated at Capetown by Mr C W Mally, the Cape Entomologist, at Pietermaritzburg by Dr E Warren, the Curator of the Natal Government Museum, and at Pretoria by the writer. It has had the same extraordinary killing effect on its food plant at all three places, while Cape Cochineal cultivated on neighbouring plants for comparison has done little damage.

"About September, 1913, Dr Warren placed some material of the Indian species in a clump of *Monacantha* prickly pear growing by the Red Hill Road, a few miles from the centre of Pietermaritzburg. The clump was about ten feet in diameter and eight to ten feet high. The insect soon spread all over the clump, and in the following winter only the trunk like stems were standing. The joints had blighted and fallen down singly or in masses around the stems, presenting a most miserable spectacle.

"About December, 1913, Dr Warren infested a clump of the plant in a valley on the other side of the town. The insect thrived here quite as well.

"At Pietermaritzburg, Capetown, and Pretoria, repeated attempts have been made to establish the Indian Cochineal on other prickly pears than the *Monacantha* kind. These attempts have been in vain. With the doubtful exception of the *Cochinelifera* species, the *Monacantha* prickly pear is the only plant of any kind whatever known to be attacked by the insect, and as the insect has occurred in India for 120 years without taking to any other kind of plant, there is no fear of its taking to any other kind in South Africa. As remarked in a foregoing paragraph none of the species of cochineal insects have been recorded on any plants except prickly pears. With prickly pears are, of course, included the varieties that it is becoming the fashion to call spineless cacti. The true cochineal might perhaps be able to live on some of the spineless ones, but I have no fear that the Indian species is capable of living on any except the thin leaved *Cochinelifera* kind.

"To get the insect started at a new place, nothing more is required than to put an infested joint in contact with a *Monacantha* plant. It is well, however, to jar some of the insects off on to the plant and then to tie the infested joint in a sheltered position face to face against a green joint, as by these means fewer of the insects are lost."

In a Note, dated February 1920, on the matter quoted from his paper in the *Agricultural Journal of South Africa*, Mr LOUNSBURY states —

"The insect has cleared the *Monacantha* prickly pear from Nabal or at least from all the places where the plant was known to the Division. We keep a little stock on hand in Pretoria by breeding in joints we set out from time to time in the office garden. The insect seems invariably fatal to *Monacantha* but it never is found on the other species nor on the 'spineless cacti' imported from California, Algeria, etc."

PORT HEALTH SERVICES

The world is indebted to the United States of America for the formulation of principles guiding the League of Nations. The root of the suggestion is that, of their own option, nations shall treat each other with complete frankness and trust, the enhancement of good and the dethronement of evil is expected.

When, however, disease which may spread from one nation to another and incidentally may affect America is dealt with, international action is no longer trusted to, that country, being eminently practical in all its methods, prefers "direct action," and, without belittling the fact that the League of Nations may in international politics (and even in disease prevention) prove effective, few sanitarians who have had experience of Port Health work would not prefer to regard, in the latter matter, international understanding as the inferior method. The importance of the direct action by the United States Health Service in prevention of disease spread has been referred to from

time to time in this *Bulletin*. In a very full and able Report for 1919, issued as Service Publication No 16 of the Maritime Quarantine Service of the Commonwealth of Australia (Director, Dr J H CUMPTON,) the method pursued by America is thus described —

"The laws of the *United States of America* prescribe that any vessel at any foreign port clearing for any port or place in the United States shall be required to obtain from the consul, vice consul, or other consular officer of the United States at the port of departure, or from the medical officer, where such officer has been detailed by the President for that purpose, a Bill of Health, in duplicate, in a prescribed form, setting forth the sanitary history and conditions of the said vessel, and that it has in all respects complied with the rules and regulations in such cases prescribed for securing the best sanitary condition of the vessel, its cargo, passengers, and crew

"This provision is far in advance of that adopted by most nations, in that it imposes by statute and obligation on the vessel to bring a Bill of Health *given by a United States official*, setting out the condition of the vessel at the time it left any foreign port

"The quarantine laws of the United States also prescribe that it shall be the duty of the Surgeon General of the Marine Hospital Service to obtain information of the sanitary condition of foreign ports and places from which contagious and infectious diseases are or may be imported into the United States, and the consular officer is required to make weekly reports of the sanitary condition of the ports and places at which they are respectively stationed "

The American Public Health Service has, by means of the organization thus briefly sketched, not only kept itself well informed of the movements of disease throughout the world to its own manifest advantage, but by periodical publication of data obtained by it has rendered useful international service. With this example before it, possibly the newly formed Ministry of Health of Great Britain may, in due course, attempt a similar development, but a "Memorandum, addressed to the Minister of Health" by the Chief Medical Officer, Sir George NEWMAN, shows that (at present at least) it would trust to a League of Nations Policy. The following is the reference made to this important subject in the Memorandum —

"Through successive international conferences British representatives have urged the adoption of scientific lines of preventive action in regard to epidemic diseases which may be carried by ship, which on the one hand would be safe and expedient, and, on the other, would cause the minimum of interference with passenger traffic and maritime commerce. Successive international conventions have more and more followed British guidance in this matter, making mutual agreements which would avoid the vexations and dislocations of business which would result from what was formerly known as 'quarantine'. Not only is it desirable to improve international communications for the practical purpose of following up and preventing epidemics, but there are many other health subjects on which international understandings (formal or informal) would be of great value to all concerned. The study of death statistics, for example, would be made more valuable by closer correspondence in the nomenclature of disease and the causes of death and by a uniform system of tabulation, measures to secure better health of the mercantile marine, and particularly to deal with venereal diseases in sailors, would obviously be assisted by international arrangements for their supervision and treatment at different ports, the question of pilgrimages within or affecting the Empire, an international pharmacopoeia, the control of anthrax, poisonous drugs and food standards, the principles of hygiene in the Tropics, co operation with the international League of Red Cross Societies in its civilian relief and public medical services, the new health work emerging before the League of Nations—all these questions of international health will demand fuller consideration as inter communication increases between all parts of the Empire and between the nations of the world."

Dr CUMSTON gives in the following statement reasons which will be recognized as sufficient ground for not trusting to International Conventions only—useful, as doubtless they may be, within certain limits. When it is remembered to what extent in commerce free intercommunication with ports must depend upon their health state, and what financial loss even a few hours delay to a ship on completing its voyage to a port may mean, the full meaning of Dr CUMSTON'S last sentence, as now quoted, becomes very evident —

"The health report can be, is intended to be, and should be, acceptable as a faithful and accurate record of everything of interest to the Quarantine Officer which has occurred throughout the voyage. As certain important items of information contained in it are available from no other source it is realized that it is an essential portion of the quarantine system. If it could be accepted as entirely reliable, the Quarantine Officer's work would be simplified, and the restrictions on and delays to shipping could be materially reduced. At a later stage the difficulties in the way of so accepting it will be indicated.

"The Bills of Health carried from countries overseas are open to similar criticism. There is as yet no other method of ascertaining whether epidemic diseases exist or are unduly prevalent in ports recently visited by the vessel concerned than this system of Bills of Health. Under the Paris Convention signatory countries undertake to supply information on these Bills of the condition of the port at the time of the vessel's departure. Under the British system these are issued by the British consuls in foreign ports, and it is obvious that these officials can possess only such information as is supplied to them by the local authorities, while there is also the possibility of error or carelessness on the part of themselves or their staff.

"Here is a system based entirely upon mutual confidence. The degree of success attending such mutual trust is neatly indicated in the resolution adopted by the Paris convention—

"That the Governments should confer together with a view to regulate Bills of Health from an international point of view, or to suppress them."

"The deliberate issue of false Bills of Health by authorities who fear that there will be undue discrimination against their vessels has not been unknown.

"Here is seen then a system of defence which essentially and necessarily relies upon the good faith of others. It is unfortunate that such reliance cannot in the present state of human and official development be in any way complete."

The Report enters into details of organization resulting from much experience in Port Health work, and describes very fully all arrangements for disinfection, housing during quarantine of passengers, hospital accommodation, etc., it should prove of interest and utility to Port Health Service Officers in all parts of the British Empire, by enabling comparison of methods pursued being made, and, possibly therefrom, some better system than at present exists being excogitated for bringing about coordination in methods.

RAT-PROOFING

Rats can be diminished in numbers by poisoning, trapping and fumigation in a locality, to an extent apparently sufficient to decrease the average incidence of plague upon a population at a critical part of the year, in a locality where plague has become indigenous, but this is the limit of success hitherto attained against an animal that refuses to be exterminated. Offensive defensive proceedings however are of utility in protecting certain positions from invasion. Of these the acid-tar method described in this *Bulletin* (Sanitation Number) Dec 15, 1919, p 349, when carefully applied certainly yields excellent

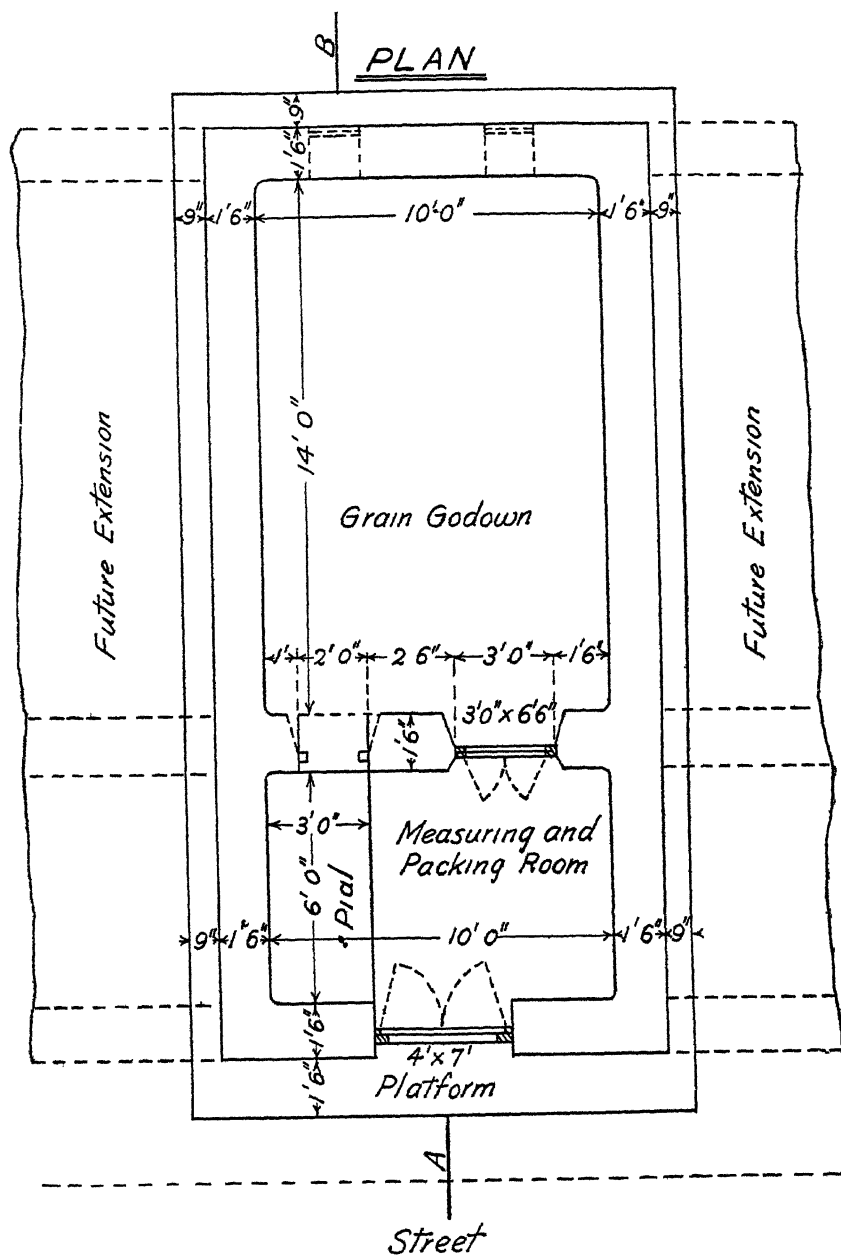


Fig 1

Madras Sanitary Board Type Design for a Rat Proof Grain Godown

results as an epidemic expedient, but rat-proofing of buildings containing food or affording shelter of a nature approved by rats, is fast becoming a recognized necessity—if not in the interest of plague prevention, at least in the interest of economy. A well-known mode of intercommunication of plague of rat and man is the placing of stores of grain adjacent to shops where it is sold in retail—a mode common to most Eastern bazaars. Such stores if permitted at all in proximity to dwellings must be rendered rat-proof. Hence, instead of hastily devising a plan at the last moment when plague is threatening an area, it is well to be prepared with a type design that will meet common necessities of the case. In the simplest possible form, such a plan has been issued by the Madras Sanitary Board for the protection of grain stores as per figs 1 to 3 annexed.

FRONT ELEVATION

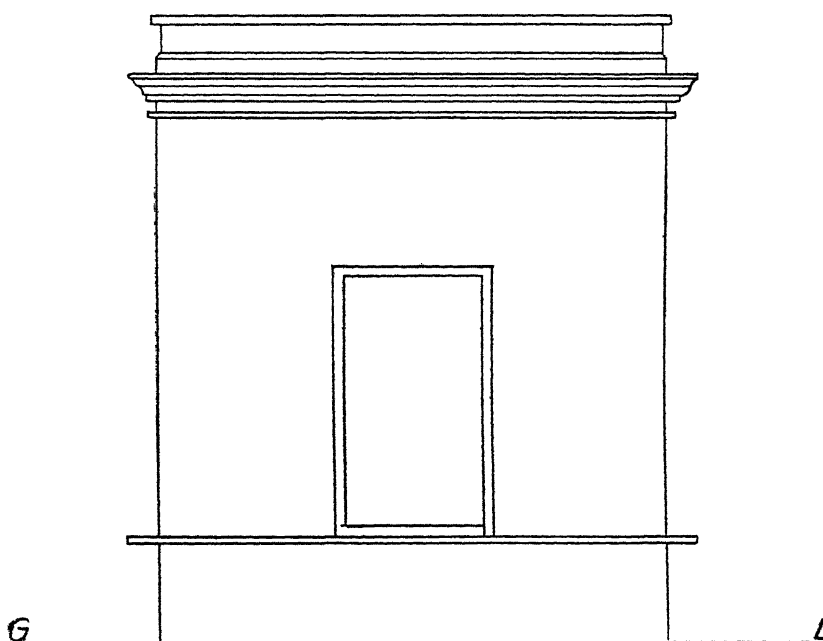


Fig 3

Madras Sanitary Board Type Design for a Rat Proof Grain Godown.

The following is an extract from a Note by Mr W HUTTON, Chief Engineer, P W D, which accompanies the specification, etc, of the plan.

' The two designs now prepared are expected to be rat proof owing to the following features —

“(1) The projecting cut stone, Cuddapah slab or reinforced concrete slab all round the building at basement level will prevent rats from climbing up the walls and so gaining entrance into the grain godown.

“(2) The floor consists of sand filling in 4 inches depth of concrete in mortar over it, and Cuddapah or granite slabs over the concrete, it is therefore impervious and will not allow rats to burrow up from below.

"(3) The walls are of masonry in mortar and will also prevent rats from burrowing through them

"(4) All corners are rounded, and rats cannot easily lodge anywhere in the building

"(5) The door is close fitting and rat proof

"These designs are intended to serve as guides and not to be rigidly adhered to but may be altered according to local conditions so long as the principle of preventing entrance of rats is not lost sight of "

SANITARY ORGANISATION

SANITARY INSPECTORS IN THE TROPICS

The urgent need of Sanitary Inspectors to carry into effect the details of the hygienic care of populations is referred to in the subsequent Note on the subject of "Child Welfare". The same matter is also urged in the Annual Report of the Uganda Protectorate for 1918 by Dr G C STRATHAIRN, the Ag Principal Medical Officer. He shows that for the formation of an executive sanitary staff there is at disposal excellent material in the "Uganda native boy". Major G KEANE, D S O, at the outbreak of the War, enlisted and trained 260 of these men. They were embodied for War service as the Uganda Native Medical Corps. So useful did they prove that Major KEANE was required to increase their number to 1,000 and, as reconstituted, the Corps was known as the African Native Medical Corps. Dr STRATHAIRN makes the following remarks on the subject —

"This corps has, I understand, proved itself most useful throughout the East African campaign and has earned universal praise. Sixty per cent of its enlistments, which numbered about 1,650, were Baganda boys.

"Their work in East Africa has proved that these boys are capable of being trained to a high degree of proficiency as Hospital Attendants, Vaccinators, Sanitary Inspectors, etc., as also for the more technical duties of Laboratory and Dental Assistants.

"It will be necessary to start a training college for new boys and proposals will be submitted during the year for this very necessary work."

Dr STRATHAIRN has however found a further field for utilization of indigenous labour for professional purposes. In connection with mosquito or insect borne disease he states —

"I may mention that we have enrolled certain of the African Native Medical Corps, who have had some training in Military Laboratories during the last two years and whose skill in staining and diagnosing routine blood slides is wonderfully good."

The dearth of technical aid in the accomplishment of details, which may frequently consume valuable time that may be better employed by the professional man, may often be met by generous interpretation of psychology when in contact with tropical races. It is hopeless in tropical climates to expect that sanitary personnel should be solely of European origin, nor indeed, would it be advisable. To place among a people representatives of their own race fully convinced of the benefit of Applied Hygiene not only secures for them the best form of practical teaching, but is the best way to secure information as to racial peculiarities which may obstruct hygiene by their being misinterpreted by the Sanitarian but which, in the presence of knowledge of their nature, may be turned to good account in advancing requisite measures. Sir Walter BUCHANAN, K C I E, I M S, was the first man in the East (shortly after Ross's solution of the malaria problem) to grasp the fact that an intelligent oriental layman could be trained to the microscopic diagnosis of malaria. He trained convicts for the work, and his example was followed elsewhere in the jails of India and Burma. Certain of these men, after release from jail, were given employment where the knowledge they had gained was utilized.

CHILD WELFARE

In British Guiana, in 1914, a Baby-saving League was inaugurated which, according to Reports issued by it as well as from the independent testimony of Surgeon-General WISE, has attained considerable success in ameliorating the conditions of infant life in that Colony. The importance of the subject having arrested the attention of the Secretary of State for the Colonies, he invited the Administrations of the East Africa Protectorate, the Uganda Protectorate, Zanzibar and Nyasaland to consider the possibility of instituting some form of similar movement in their respective areas. To this end, the Principal Medical Officer, East Africa Protectorate, convened a meeting of Medical Officers to confer on the subject. The Meeting came to the conclusion that it would be necessary, in laying down any scheme, to hold in mind the fact that the community to be dealt with being of widely different habits there would be required somewhat differently constituted organizations for dealing with Europeans, Asiatics and Africans.

The meeting arrived at the opinion in regard to Europeans "that the scheme should embrace two points—(1) Systematic instruction in all European schools in general hygiene (this subject is already included in the syllabus of training in Protectorate Government Schools) and—(2) Lectures and demonstrations to Mothers." In regard to the Asiatic and Goan community, it was resolved that probably systematic instruction and demonstration in personal and domestic hygiene, aided by the visitations of selected female instructors is likely to be productive of much benefit to the community." As to Africans, the meeting considered that, with the exception of Mahomedan and Pagan tribes where special arrangements would be necessary, owing to their theological opinions, it would be feasible to support and extend the excellent medical work now being undertaken by the various Missionary Societies in the country.

"It was also agreed that Administration officers, Medical Officers, Settlers, Missionaries and others should be provided with a suitable hand book of practical sanitation as affecting natives, (2) that a strong Government sanitation staff operate in the Native Reserves, where trained European and Native Sanitary Inspectors would be invaluable in promoting the practice of general hygiene by means of practical demonstrations, and by continual visiting in their respective districts."

The recommendations made by the meeting appear decidedly practical, and likely to meet the requirements of the first step in securing the eugenics of the various races concerned, "the selected female" to advise and demonstrate correct methods, the teaching of school hygiene, and the eliciting interest in sanitation by lecture and demonstration are to be applied where they respectively will be most appreciated, but the final suggestion of employing trained Sanitary Inspectors meets unsaid the crux of the matter. A well trained, judiciously selected and administered staff of Sanitary Inspectors (preferably in executive grades drawn from the races dealt with) would be capable—as suggested by the Resolution—of teaching sanitation to the people by the most powerful of all methods, viz, by practical demonstration, but the insistence of this proviso shows that the meeting was aware of the very obvious fact that, whilst the "selected" female may be useful in showing (where artificial feeding of infants has become necessary) that it is undesirable to use bottles

or rubber nipples which are foul, huts (albeit they are cleanly) situated within the flight distance of flies from human excreta grounds, or within flight distance of mosquitos from neglected pools, will not shelter either healthy infants or healthy mothers in spite of her care as to domestic details

The example which British Guiana set of forming a "Baby-saving League" was some time back followed by Jamaica, and Dr Lawson GIFFARD, Superintending Medical Officer, in his Annual Report for 1919, gives the following opinion as to the work fulfilled by it —

"This highly useful and beneficent organization carried on its humane work during the year. The subject of the preservation of child life is one of the most important Medico social questions of the day and one that seems to be claiming attention in all civilized countries. The wastage of life during the first few months of birth, not to speak of ante natal losses, is enormous and every agency having for its object the checking of this waste is worthy of every encouragement. It is hoped that the modest annual grant in aid voted by the Legislative Council will when financial circumstances allow not only be augmented but extended, and that this aid will not be confined to Kingston alone."

In 1906, in Rangoon, a Society for the Prevention of Infantile Mortality was inaugurated by Mrs Lila OUNG, a Burmese lady, aided by the advice of Lt-Col E ROST, I M S. From this centre, Societies have been formed in Mandalay, Moulmein, Thabon, and Sagang. Lt-Col WILLIAMS, I M S, in his Annual Report on the Sanitary Administration of Burma for 1918 (p 5) makes the following remarks on the subject

"The Rangoon Society now employs eight midwives and one medically qualified lady visitor. The number of confinements attended was 1349 of which 997 were among Burmese women. The Returns show an increase on 1917 of 429 confinements attended. There were 1,166 live and 44 still births. The twin births totalled 9. Five deaths occurred among mothers and 89 among infants. The society is well financed—its expenditure for the year being 12,915 and the closing balance being 10,103 Rupees. It has been agreed on the suggestion of its President to substitute for its present cumbersome title that of 'Society for the promotion of infant welfare'."

"This Society has evolved a scheme for opening maternity wards in various poor quarters by which the sphere of its already highly valued social services will be still more widely extended."

The City of Madras having considered the subject since 1905 (when the Madras Government urged the Corporation to adopt suggestions by its then Sanitary Commissioner for the employment of "selected women" trained both as to nursing and Hygiene and the opening of pasteurized milk depots in conjunction with their efforts) has now before it a scheme framed by Dr Raghavendra Rao, the present Health Officer of the City of Madras, which he describes in his Report for 1918. He proposes to make a central part of his scheme the entertainment of Certificated midwives, so as to displace the "barber midwife" and her barbarous customs. There can be no doubt of the soundness of this mode, and it will be observed it is one which has already commended itself to the "Society for the promotion of infant welfare" in Burma. The Madras City should find no difficulty in finding suitable personnel for this scheme. Although the effort apparently never found favour in the precincts of the Madras City, in District Municipalities of the Madras Presidency, Certificated midwives have worked under a "Results system" for 40 years. Indeed, it is probable that, in the Madras Presidency, the education and examination of

midwives preceded action of this character elsewhere in the East. The Government of that Presidency, in 1862, intimated that it desired to "encourage the education of midwives and Native Medical practitioners in European Medicine." By 1867, it was reported that "of late years considerable encouragement has been given to the training of midwives both in Madras and in the Provinces. In Madras, upwards of 85 European and East Indian women have obtained certificates of competency from the Lying-in Hospital."

INFLUENZA IN AUSTRALIA

A Report (Service Publication No 18) has been issued by the Director (Dr J H L CUMSTON) of the Quarantine Service, Commonwealth of Australia, which affords much valuable information as to the manner in which the various circumstances arising from the epidemic of influenza of 1918 were met.

Quarantine—On the important question of attempting protection of a country by requiring quarantine of vessels arriving from areas infected with influenza, the following is the result of experience gained—

"There does not, at this present stage, after six months of extensive experience, appear to be any fact invalidating the general principle that any vessel arriving in port after at least four days' journey, without any case of identifiable influenza having occurred during the voyage, will not develop, within a period of seven further days' detention in quarantine for observation, any primary case of influenza, and that the admission of such vessel to immediate pratique will not offer any risk to the community, provided that any case of sickness on board at the moment of arrival, which presents any doubtful aspect, be considered as reason for detaining the vessel until all doubt is removed. The provision of a further period of surveillance of passengers and crew may be considered as advisable but, with the single exception of *Atua* (3) (No 3), there has been nothing in our six months' experience to suggest the necessity for this."

Anti-influenza vaccine

The following exhibits the constituents of the vaccine employed in Australia, it was made in two strengths—

"A" strength per c c

B influenzae	25 millions
M catarrhalis	25 "
Pneumococcus	10 "
Streptococcus	10 "
A Gram positive Diplococcus (not the Pneumococcus) isolated from all the cases examined	10

"B" strength per c c

B influenzae	125 millions
M catarrhalis	125 "
Pneumococcus	50 "
Streptococcus	50 "
A Gram positive Diplococcus as above	50 "

"The doses we employed in our vaccines did not differ materially from those suggested by the English Committee appointed to consider the advisability of prophylactic vaccination. The findings of this Committee did not reach us till sometime after our vaccines had been issued. No extensive work on prophylaxis with such a vaccine had been done. The

pneumococcus alone has been used by Lister in South Africa in the prophylaxis of pneumonia (not influenzal pneumonia) with good results. In this case the doses given were very large. Several things militated against the use of large doses —

“(a) It is not easy to produce the great volume of growth. Lister could not produce 40,000 doses of his vaccine on short notice.

“(b) Our vaccine had to contain several organisms.

“(c) There is no convincing evidence that such large doses are needful.”

As a result of elaborate mathematical treatment of the data collected on the subject of efficacy of these vaccines, the following conclusions were arrived at —

“1 Inoculation reduces the death rate to one third of its value for uninoculated, and the percentage of C type cases to one half.”

“2 The longer hospitalization is delayed the greater becomes the probability of death or of onset of C type influenza. This is true for inoculated and uninoculated.

“3 The liability to infection after inoculation is constant after five days. From 0 days to five days it is higher, ascending gradually.

Note — It might be found on collecting more data that the numerical results deduced in this enquiry were materially altered. This would be due to a change in the incidence of the epidemic and not to inaccuracies in the present working. Mathematically, using the terminology of page 96, it would be equivalent to a change in the probability p , such change not being covered by the standard errors deduced on that and following pages.”

The following opinion is given as to the range of usefulness of masks —

“The value of masks in practice would appear to be limited to protection against gross infection at short range, under conditions involving short duration to exposure, and to be determined by the make, fitting, and use of the apparatus. The observations of Teague and Strong in connection with mask protection against pneumonic plague go to show that, for absolute protection from droplet infection by the bacillus prodigiosus for even short periods, an elaborate hood of several thicknesses of Canton flannel is required. This is incompatible with the requirements of ordinary ward or station work in warm weather. Short of absolute protection, however, a properly fitting flat mask of two thicknesses of lint, or six or more thicknesses of close woven gauze, with nose plugs of wool, appeared to afford very substantial protection, if the defects involved above were avoided.”

Prophylaxis by inhalation — The conclusion arrived at after employment of steam chambers, such as considered of utility in dealing with cerebro-spinal fever is thus stated —

“Consideration of results reported from the several divisions points to the conclusion that, whilst inhalation may be regarded as an auxiliary measure of some value when applied under quarantine conditions, which permit of the elimination of these drawbacks, some more satisfactory medicament than zinc sulphate is required for charging the steam. Chloramine T was discarded at a preliminary stage on account of its irritant effect, and inquiries are in hand with a view to obtaining further direct experimental observation with reference to the technique of naso-pharyngeal medication by large scale inhalation methods.”

* C type denotes toxic or fulminating influenza with severe pulmonary complications, such as pneumonia, bronchopneumonia, pleurisy.

SANITARY RULINGS

VENEREAL DISEASES IN AUSTRALIA

In Service Publication No 17 of 1919, the Director of Quarantine, Commonwealth of Australia (Dr J H L CUMFSTON), has issued an interesting report upon measures adopted in Australia to stay the prevalence of venereal diseases. He shows that, in 1908, Sir Harry ALLEN, at the Australian Medical Congress held at Melbourne, insisted that the subject of syphilis was "of the utmost importance for the well-being of the individual and for the safety of the community."

After considerable discussion the following Resolution was carried — That syphilis is responsible for an enormous amount of damage to mankind, and that preventive or remedial measures directed against it are worthy of the utmost consideration.

It will thus be seen that Australia long anticipated the awakening of nations to the danger attending the deadly diseases which are classed as venereal. Dr CUMFSTON shows that the Commonwealth has acted in accord with the ever present demand of "Advance Australia," in co-ordinating the efforts of the States in the required direction, although there rests with it no power by which it could be demanded that a State shall fall into line, by adopting any particular legal measure for combating these diseases.

After the Congress of 1908, medical opinion became more consolidated and in the presence of the fact that, on discharge of the soldiers of the Army raised for the great War, no less than 55,600 were registered as having suffered from some form of venereal disease, public opinion has not failed to support requisite measures. The first State to take legal action was Western Australia, in 1915. Since then, Victoria, Tasmania and Queensland, have passed the necessary Acts. Dr CUMFSTON describes the fundamental principles involved in these Acts, as follows —

"The object of the provisions was that venereal disease should be treated as disease, without any attempt being made to deal with the question of these diseases in their relationship to moral questions, or to any question of social or economic science. The question of venereal disease is, by these Statutes, made entirely a matter of public health, as it should be, and, until it has been shown that the attempt to deal with these diseases as diseases has failed, no attempt should be made to confuse the issues of morals and prostitution with that of eradicating these diseases from the community as far as possible.

"The Act aims at this eradication, and the means by which it is expected that they will achieve this result are the application of compulsion to insure that every person immediately upon the appearance of any symptom of these diseases shall be at once under the treatment of a doctor, shall at once receive a definite and unmistakable warning of the infectious nature of his condition, and shall remain under treatment until he is cured."

The details of the Acts passed by the Australian States provide for — (1) prevention of treatment of venereal diseases by any other than a qualified medical man, (2) that treatment must be continued regularly by the patient, (3) that when cured the medical attendant must give to the patient a certificate to that effect in a prescribed form, (4) the medical attendant must notify that a patient, whose name and address is omitted, has consulted him, (5) if the patient fails to attend regularly the name and address is communicated to the Dept., (7) any act by

the medical attendant brought about by failure to attend regularly by the patient is treated under privilege, (8) at the first consultation, the medical attendant provides the patient with a notice "directing the patient's attention to the infectious nature of the disease and to the legal consequences of infecting others, and warning the patient against contracting any marriage until certified as cured," (9) the State provides for free bacteriological examinations, and requires all Hospitals receiving State subsidies to make effective provision for examination and treatment of any person, free of charge, (10) prisoners may legally be detained in jail beyond the period of sentence, for such a period as is necessary to effect their cure, when suffering from venereal diseases, (11) "provision is made for preservation of secrecy in respect of all administrative acts and all legal proceedings," (12) advertisements setting forth modes of cure and appliances in connection with venereal disease are forbidden.

As Dr CUMPTON remarks, it can hardly be expected that, within a short period of such Acts coming in force, there should not occur numerous flaws and possibly attempts at evasion, in respect to notification. Taking however such notifications as have been received, some approach to facts has presumably been attained. Dr CUMPTON states — "On the basis of the estimated population at the end of 1916, the rates per 100,000 of population were as follows —

	Syphilis	Gonorrhoea
Western Australia	113	350
Victoria	164	381

PROTECTIVE ZONES

In his Medical and Sanitary Report (Government of the Gold Coast) for the year 1918, Dr J B ALEXANDER upholds the sanitary importance of the institution of zones free of habitations separating races, in the following terms —

"The recognition of the principle of segregation by others than the Samaritan and those who have benefited by it is a slow growth, but during the year four new buildings for non officials were started in the reserve at Accra

"The question is whether segregation of Europeans from natives should not be made compulsory, and it may be that we are not fulfilling our legal obligations in not insisting that it should be so. Apart from the minor details of comfort, segregation may conceivably spell the difference between life and death to many a resident on the Coast

"The adoption of complete segregation does not mean that the requirements of the Native Area will be neglected, improvement will go on *pari passu*, but it means that the chances of one section of the community developing diseases to which they are peculiarly liable will be reduced to a minimum, if not entirely disposed of"

In further reference to the subject, however, at page 25 of the Report the following statement appears —

"The large tracts of land which are now kept open as free zones to segregation areas present an expensive problem in the matter of clearing, especially in places like Accra and Coomassie. The experiment has been tried of allocating the land to the difference Hausa speaking communities to farm, thereby putting it to a use for the common good and at the same time serving the purposes of the Public Health requirements. By this procedure the land is not denuded of vegetation, while rubbish and undergrowth are disposed of—this being the charter upon which the farmer is allowed to have tenure of his allotment"

At first sight, this proposal would seem to meet the demands both of economy and sanitation. A very short experience however of attempting to supervise in the interests of sanitation a protective zone handed over to various private parties for farming or any other purpose, would show that irrespective of endless friction which the method would occasion—however adroitly the agreement had been drawn up—a special staff to undertake supervision would be requisite. The principle should be rigidly adhered to that protective zones are made in the public interest, and no private person should possess any manner of right over the land concerned. The prime object is that not only the flight distance of mosquitos and flies should be provided against as far as feasible, but that the area itself shall be maintained in a scrupulously exact sanitary condition.

SANITARY WORKS

ANTI-MALARIAL WORKS IN EGYPT

Factious critics of public personages have been known to comment that Private Secretaries when required to hunt up data on important public questions invariably ask what is required to be proved—in accord with the axiom that figures may be made to prove anything. Against Commissions also this variety of critic is prepared to suggest one of two evil things—either they are appointed to divert attention from requirements involving financial outlay at a time inconvenient to the Government concerned, or to shift the burden of responsibility from worried officialdom to the shoulders of the temporarily embodied corporation. No such legend can be attached to the Anti-malarial Commission appointed by the Government of Egypt, which has recently issued its Report *

They have not sought to show that the Government of Egypt might satisfy itself by issuing a certain amount of quinine to the people, but whilst by no means ignoring the efficacy of this drug when kept within its proper sphere of duty, they have from beginning to end of their Report endeavoured to determine the various localities concerned in malarial propagation and spread, the respective causes of the conditions in these localities and methods of remedy applicable to each. With sound judgment they have arrived at the conclusion that their aim should be not to secure temporary amelioration of conditions, but permanent relief, by means of anti-malaria works. They considered it their duty to advise the dealing with notorious endemic centres in the first place and, secondly with populous areas in which anophelines are present under favourable conditions for multiplication within such ready communication with malarious centres as to incur serious risk of early importation. Where finance obviously could not meet the requirements of all localities demanding remedial measures the carrying out of works has been advised in order of urgency, and whilst at present a *non-possumus* has been recognized, there has been no hesitation in pointing to the near future for accomplishment of the total, as absolutely needful for the prosperity of the country. In the effort to make sure that, with lapse of time, the necessity for continuous effort in defined directions shall not be forgotten, the Commission completes its Report by stating that "They recommend that the Commission sit permanently to exercise general control over the campaign."

The influence of the Nile—Egypt presents peculiarities which are largely common to delta lands and to tracts of country under irrigation in other parts of the world, hence, the measures proposed by the Commission have a sphere of usefulness beyond the country which is the subject of their Report. The Nile behaves much as does the Irrawaddy

* This Commission is composed of Mr LOTTENHAM, Ministry of Public Works, Chairman. In succession to the Hon R L LINDSAY, Under Secretary of State, Ministry of Finance, whilst engaged on other duties Col FOWLER, R A M C, Dr GOODMAN, Dept of Public Health. Dr GOUGH, Ministry of Agriculture (Entomological Section), Dr GRANVILLE C M G, President Quarantine Board. Dr FERGUSON, LEES, Dept of Public Health, Mr Lloyd, Main Drainage Department, Ministry of Public Works, Mr MONTEITH SMITH, Ministry of Interior.

in parts of its course or as certain of the older of the Canals of India—designed to run between embankments at about surface level, it has, by silting, raised itself above the level of the country through which it passes, and, consequently seriously influences both surface and subsoil waters. Permeation of the soil under static pressure from the Nile occurs in its immediate neighbourhood to an extent sufficient to form a subsoil sheet dependent for its movements chiefly upon the periodic condition of its source. Synchronous with the flood of the river, the subsoil sheet rises rapidly producing pools and marshes in lands at lower levels, with the subsidence of the river, there is a reflux of the subsoil water towards the river, but it is noted that this return movement is not so rapid as that attending the primary permeation of the soil. A foot-note gives the Commission's opinion as to the cause of this retardation —

“The reason for the slow natural return of infiltration water after the river has fallen has never been demonstrated by experiment and requires further investigation. It probably depends on the fact that the subsoil water rises comparatively easily through a sandy soil until it reaches the surface under the pressure of the height of the Nile, but its return is impeded by the layer of mud on the surface, consolidated by the presence of the water above, so that it remains as a collection of surface water for some time after the level of the subsoil water has fallen. The impermeability of this mud is shown in practice by the smaller irrigation channels used by the cultivators, which, though they are carried at a higher level than the surrounding land, lose little of their contents by seepage.”

The mud would doubtless operate as the Commission suggests in regard to surface water, the process of fine mud deposit has been long trusted to in prevention of percolation from bottoms and through mud banks of old irrigation reservoirs in India, and is effective, but, in this instance, there seems no reason to regard the influence of mud deposit as confined to the soil surface. On exit from the Nile mud particles would be borne in the interstices of the soil with the water, and each particle would be left adherent to grains of material or would close voids, and thus be left behind the advancing sheet of water; on reflux of the water, these deposited particles would offer resistance which would have to be overcome. Under the Nile influence, the rise and fall of the subsoil water occurs at right angles to the great river although there is also a small movement in the direction of the river flow. As a natural effect of the pressure from the Nile, on the lower and varying levels in parts of the ground commanded, there appear springs, pools, marshes and small streams at ground level at points suitable for its exit. These formations are conveniently referred to as ‘infiltration waters.’ The influence of infiltration water is to be found “in the Nile valley any point north of Asyut.”

The influence of rainfall—But, in addition to water thus added to the soil, there is to be reckoned with the more ordinary source from rainfall. So far as the majority of the country is concerned, the Commission hold that the subsoil water derived from rainfall is in reference to malaria propagation negligible, except “in the hills or in the higher ground in the desert in certain districts.” In this case the rainfall is liable to flood and overflow the ravines, and thus form temporary pools on land at a distance from them, irrespective of pools forming in depressions within the bed of these ravines on subsidence of the flood, moreover, in instances where the ravines are formed in

fissured rock, water from the ravines may appear in the form of springs or approach the surface at considerable distances from their point of origin. "Occasionally, as at Helwan, it bubbles up in the desert in the form of springs which diminish in size or cease altogether during the summer. In many places traces of it may be found by digging in the desert"

The Commission also deals with the usually acknowledged evil influence of badly aligned canals and drains, and borrow pits

Irrigated areas—A further peculiarity in Egyptian circumstances exists in the various oases. These are depressions in the desert (frequently of large area) within which, at selected points, irrigation is conducted under springs and ancient wells, the latter being fed by borings at times of a depth as much as 450 ft. The water derived from these wells is usually under sufficient pressure to deliver at the surface level, but where this is not the case rough mechanical lifts are employed by the agriculturists. In the case of overflowing wells, in the absence of crops, the water passes to waste and in the shape of numerous stagnant pools forms splendid breeding places for mosquitoes, which are said to haunt such places to an extent sufficing at sunset for them to appear "in a thick cloud". Malaria is rife and the people are under its full influence. For instance, a reference to the Appendix to the Commissioners' Report shows that in the El Dakhla Oasis children have a splenic index, in five out of twelve inhabited areas, of over 70 per cent.

Principles governing anti-malaria works—In reference to dealing with "infiltration" water, the Commission state the principles on which their intended methods are founded as follows —

"Filling in is the simplest and best solution. It is, however, obviously so expensive that it is only suitable for small sites.

"Where filling in cannot be undertaken, recourse must be had to drainage. Two general methods have been tried. In the first, an attempt is made so to lower the general table of the subsoil water that it will not outcrop at any part of the area dealt with. In the second, the subsoil water is allowed to attain its own level and is then run off from the places in which it appears into a system of drainage pipes."

The Commission calls attention to the fact that large works which will have a vast influence upon anti-malarial measures are already in preparation and execution in the interests of agriculture.

"Such works are the White Nile Dam in the Sudan and various undertakings on the Blue Nile, these will enable the maximum levels of the Nile and the length of their duration to be reduced. Comprehensive works to improve the drainage of Lower Egypt, already far advanced in two large areas and only interrupted by the war, will, it is understood, throughout seven eighths of the Delta, lower the general level of the subsoil water and tap and lead it away when it tends to collect in low lying areas."

Modes of relief of subsoil and surface water—In laying down principles recognized for application of methods, the Commission have refrained from expressing preference for one mode to the exclusion of another, but doubtless in regard to subsoil drainage, the second mode described by them will not be adopted where the first is feasible, for anti-malarial measures the best results are certainly not likely to be attained by it. Indeed, there is a forecast of this conviction in the following

paragraph of the Report —“ In experiments undertaken on North Gezira, this method successfully reduced the amount and period of flooding, *it does not however prevent the formation of small pockets of water in which mosquitoes can breed* ” *

For the drainage of building sites, the Commission emphasize the necessity for lowering the subsoil water table as the only method which can be used, but point out that low-lying spots on such sites might well be filled in, although the process is expensive. In inhabited areas of town sites, they advocate the passing of subsoil water into the sewers, and give an instance of an arrangement adopted at Cairo, by which “ the water after filtering through loose stones enters the street gullies passes down the sewers and is pumped away with the ordinary sewage. This method can be suitably employed wherever there is a Municipal drainage system ” [Whilst the method at Cairo meets local arrangements, it would require consideration of several factors in ordinary localities before it would be possible to advise admitting subsoil water to any large extent (beyond that which finds its way unbidden but generally to sanitary advantage) into a sewerage system in which pumping is employed. Nevertheless, the advantage of dealing with the subsoil water by a separate system at the same time as when introducing a sewerage system is indubitable. An early example (1868) of a method of dealing with a fairly definite amount and employing it for the useful purpose of sewer flushing was embodied in a scheme for the sewerage of Madras City by Major TULLOCH, R E.]

Kubri is cited as an instance where marsh land is formed under the combined influence of seepage from the Freshwater Canal and overflow from the Maritime Canal. Here a reticulation of open drains through the marsh is led to a main drain having outlets guarded by flap valves, closing automatically against the tide, and discharging into the Maritime Canal. The result of this work has been that the area is no longer waterlogged and is now under cultivation to the extent of 650 feddans. The arrangement is reproduced in fig 1. It is interesting to note that the main drain is formed of reinforced concrete, showing applicability of the method where brick or iron structures would present difficulty. There are sites in certain of our less advanced areas in the tropics where the struggle between the tidal effects and discharge of land drainage would benefit by the use of such devices.

A very far reaching method and presumably of much probable efficacy is the following suggestion by the Commission. Referring to drainage of swamps it is stated —“ Lowering the water level in the Ismailia Canal and branches, particularly the Suez branch. Flow would then be more rapid, the growth of weeds and reeds would be reduced. There would be less seepage and also the level of the subsoil water would fall. If necessary drains might be made parallel with the Suez branch to catch subsoil and seepage water, and divert it at intervals into the Maritime Canal ”

[The Commission give no inkling of the constitution of the subsoil in the position referred to, but if such drains would be effective their influence might possibly be aided with benefit to the lands commanded by the Canal, were it ascertained that, at a reasonable depth below

* Italics not in original

the surface, there existed a fairly uniform clay stratum. In this case, an excavation down to its level with a clay filling would effectually restrain seepage within the area capable of being dealt with by the drain, that is to say, the drain would be between the canal and the dam. The principle would be similar to that of employing a within-soil dam for holding up subsoil water for waterworks purposes.]

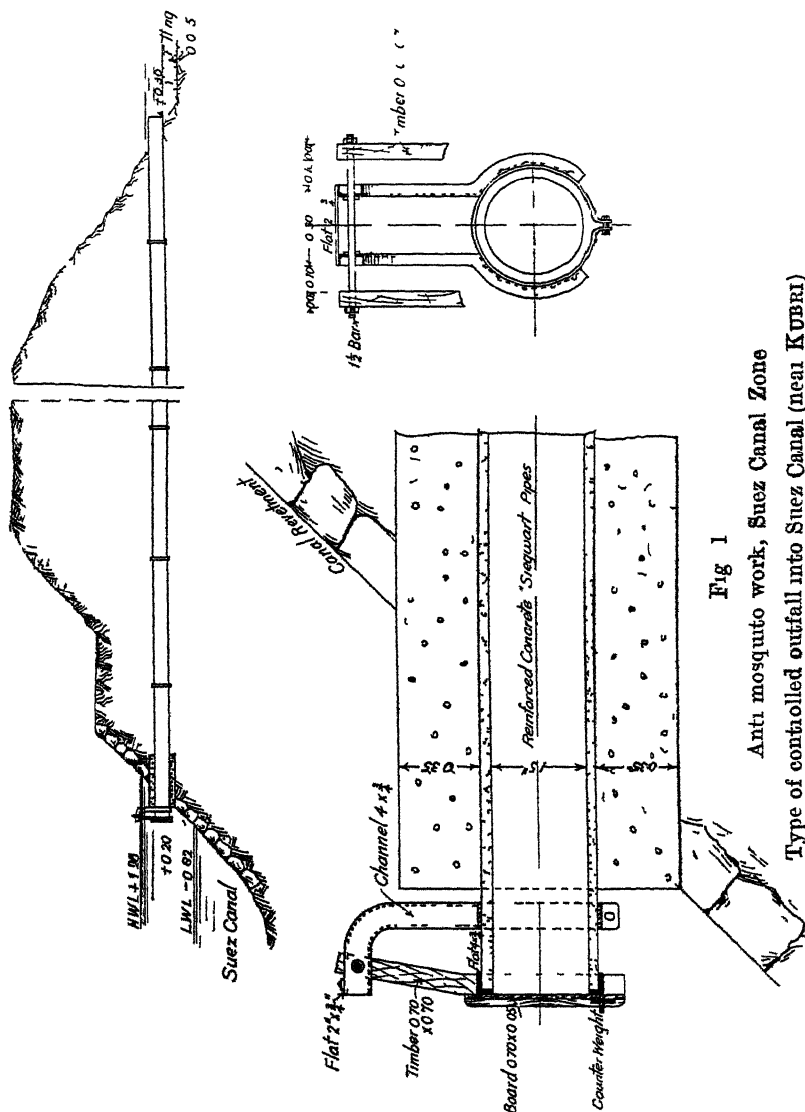


Fig 1

Anti mosquito work, Suez Canal Zone

Type of controlled outfall into Suez Canal (near KUBRI)

The Report of the Commission will doubtless obtain a great demand, it is a remarkable contribution to the consideration of anti-malarial measures as applied to large tracts of country under varying conditions.

BRITISH GUIANA

Malania

Borrow-pits have long been a source of trouble in anti malania measures. In the absence of suitable legislation the hut-owner finds in a pit made almost side by side with a new habitation material which, in the form of mud, fulfils economically the purposes of lime mortar or plaster for his walls. Nor in the more scientific realms of construction is there less tendency to seek "material" from the borrow-pit, the engineer unrestrained by legal enactment will not hesitate to court economy by resort to similar sources of supply. In British Guiana the Director of Public Works, according to his Report for 1918, has found it necessary to point out that, in the absence of stone within a distance which can be economically dealt with, it has been necessary to resort to the employment of burnt earth for the upper layers of roads as the best available substitute for "macadamizing" them. It is interesting to find that after advising a necessarily expensive scheme for the importation of stone for road metal, he pushes the moral home by the following statement —

"The digging of holes from which to obtain burnt earth is, no matter how carefully the excavations are made, a serious menace to the health of the community and from this point alone, every effort should be made to dispense with the use of burnt earth throughout the Colony."

Artesian Wells

The Director of Public Works reports that at Pen-Leonara a boring for an artesian well, which was commenced on the 24th Nov 1917, was completed, at a depth of 608 feet, by the 20th Jan 1918. The flow obtained is 172,000 gallons per day. At Faru, a well commenced on the 14th Feb was completed on the 14th March, the flow gained was 175,680 gallons. Here the depth attained was also 608 feet. At Providence, a well started on the 11th April was completed on the 5th June and afforded a yield of 47,600 gallons per day, the depth in this case was 637 feet. These are instances of rapid work and satisfactory results. No statements are furnished as to the quality of water obtained.

WELLS AND TYPHOID

It is not difficult to persuade the average layman that shallow wells may be contaminated by surface flow, and that within their drainage cones the deposit of disease-bearing matter is undesirable. But when artesian or bored wells are considered, the prevalent opinion is that their depth forbids their contamination. Yet, every text-book on the subject, of course, lays down that such faith must be subject to the non-existence of fissures or faults in the strata passed through in boring, plus many other possible factors. Faith however in artesian wells is at times shaken by causes other than variations of strata, namely, defects in the lining of bores, which need not exist in the presence of that ordinary careful and systematic inspection which must be exercised in public works. But, even with care, there may occur accidents which could not be foreseen. In this respect regular chemical and bacteriological examinations of supplies, aided

by sanitary inspection of their surroundings, form excellent safeguards. In, however, instances where bored or driven wells are drawn upon or deliver into a common main, a well may yield its contribution to the whole supply in a contaminated condition, but as a result of dilution with the total mass, its guilt may not be discovered, nothing short of throwing out of action each well successively till the erring individual is discovered would suffice in this case, when the bacteriological examination indicates suspicion. A case in point, and an improved method of checking results from individual wells, has been the outcome of conditions found at Lansing, Michigan, where a typhoid outbreak occurred coincident with the entry into wells (which had leaky linings) of sewage forced into the soil during high water of the adjacent river. The waterworks are thus described —

‘A water supply of 8,000,000,000 gal daily is obtained by the City of Lansing from 32 artesian wells, 350 to 400 ft deep in the ‘coal measure’ sandstone, the wells being cased into the rock which is covered with 20 to 100 ft of sand, gravel and mixed clay. There are five stations pumping directly into the mains. There were neither thorough and regular investigations of the lead joints between suction pipes and casings, nor any attempt made to build the frost pits water tight, with the result that the piping was under water much of the time’.

It was ultimately found that the wells at one of the pumping stations possessed a poorly made and leaky joint, and another possessed a recessed flange which was allowing “serious leakage of grossly polluted seepage to enter the casings.” These defects were repaired, but still the water was found unsafe, and it was not till two other wells were cut off from the general supply that errors were fairly traced to their source by means of what Mr DAUGHERTY terms the “sampler.” This is a device for attaching to the main of individual wells for the purpose of securing specimens for examination. The apparatus is not described, but it is intimated that a patent has been applied for.

In the meantime, leaky fittings under the influence of high water in the river containing sewage had become responsible for 3,000 cases of dysentery and 82 of typhoid. Mr DAUGHERTY makes the following apposite statement on the whole subject —

“Lansing’s experience is a very emphatic contradiction of the old deduction that because ‘the water always has been good’ it always will be good. It is only a question of time before most well supplies become unsafe, on account of (1) deterioration of joints and piping, (2) pumpage in excess of normal capacity of the wells causing fissures at the bottom of the casings, and (3) careless abandonment of wells penetrating the same water bearing strata.”

The “sampler” devised by Mr DAUGHERTY should prove of great utility as a safeguard when more than one source is pumped for public supplies.

FLY-PROOF LATRINES FOR ASIATICS

A latrine seat so arranged that without touching it with the hands it shall open previous to the act of defaecation, and automatically close thereafter, so as to effectually exclude flies, would undoubtedly be of sanitary utility. The annexed plan shows such an arrangement actuated by weight of the user, counter-weight and lever action, which has been patented in India by Major SCROGGIE, C I E I M S.

It doubtless will attract attention for employment by Indians who use the *a la Turque* position, more especially it would find favour in dwellings of the better class. [There are few things new under the sun. It is difficult for the writer to perceive any essential difference in the principle employed by Major SCROGGIE from that patented in India, in 1895, by the late Dr CHALKE, a covenanted Medical Officer of the Madras Medical Service.* In addition to the automatic

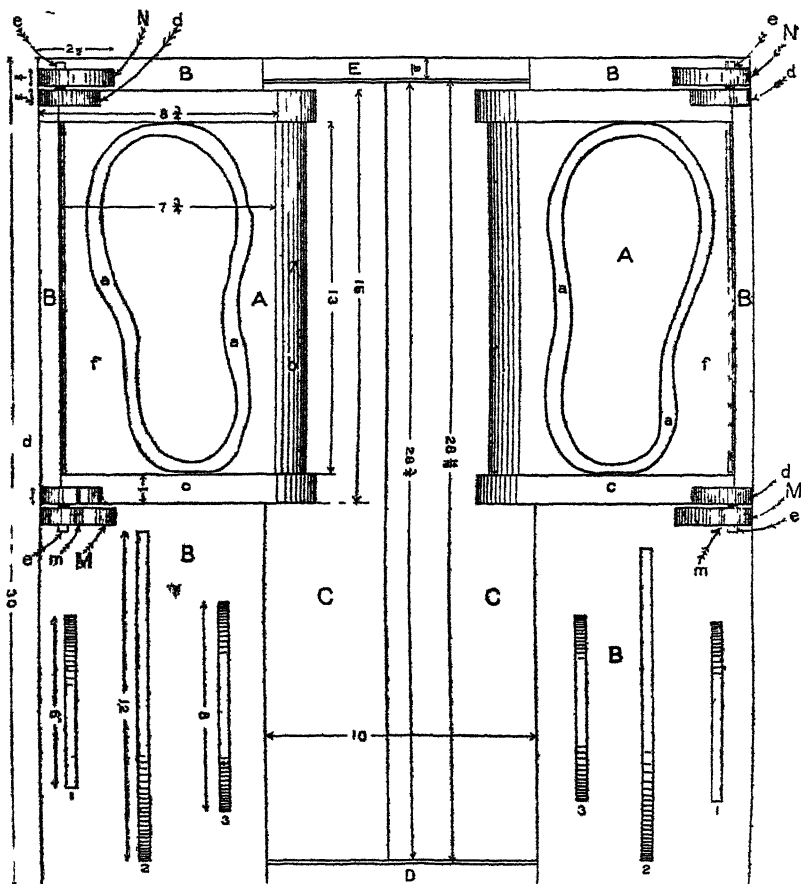


FIG 1

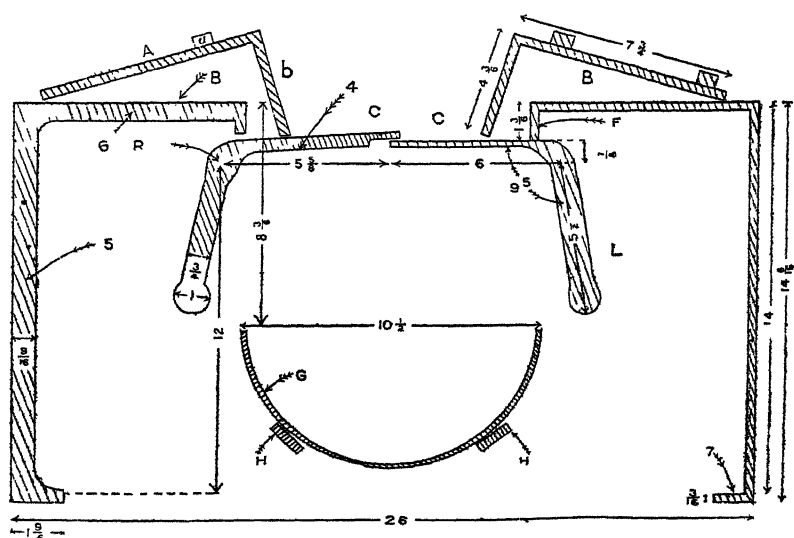
Plan

Fly Proof Latrine Seat for Indians
(By Major W R J SCROGGIE, I M S)

opening and closing of the seat of the lid, Dr CHALKE'S arrangement also provided for the automatic covering of the excreta with deodorants or disinfectants. The specification for the patent by Dr CHALKE in 1895, contained the following statements — "The machine is the

* No 904 P Dept of Rev and Agr Register No 325 of 1894, dated Calcutta 23rd March, 1895

same as Chalke's 'self-acting disinfecting commode' already patented, when occupied, namely, by the lid automatically descending by the weight of the occupant and the shutters or doors receding to the sides of the box or otherwise opening, leaving the opening in the lid perfectly free for the occupant's use, and, secondly, that of a dry earth supplier, after the occupant vacates his seat, by spreading the dry earth on the evacuation below." The two simple agents necessary to work this commode automatically are the occupant's



Section

Fly Proof Latrine Seat for Indians

weight and the material weight "to restore the commode to its original position. What is novel in this machine is the arrangement of the several parts which is quite new. Two pairs of levers of the first order and the weight attached, work the whole of the machine without the aid of springs. Lastly, the pedal in front is also a novel arrangement"]

VITAL STATISTICS

GOLD COAST

In 1916, the death rate for European officials under the Gold Coast Government was 8.7 per mille, and for European non-officials, members of mining companies and missionaries 7 per mille, in 1918, however, the figures, respectively, were 11.6 and 38.2. The total death rate for Europeans of all classes was 30.71. The following remarks on the subject are made by the Principal Medical Officer (Dr RICE), in his Medical and Sanitary Report for 1918 —

The final figures quoted above reveal a general European death rate out of all proportion to any figures that can be quoted for recent years, a death rate of 30.71 per 1,000, and show also a striking contrast between the European Official and the non official death rate, the former not much above the normal for recent years, the latter attaining the alarming figure of 38.22 per 1,000. The abnormal European non official death rate was undoubtedly largely due to their not seeking medical treatment in the early stages of the disease, and also to the fact that owing to the shortage of medical officers many of them were not within the reach of medical aid when first attacked.

LABOUR EFFICIENCY IN EAST AFRICA

The Principal Medical Officer (Dr A. D. MILNE), East Africa Protectorate, in his Annual Medical Report for 1918 states (p. 14) that "the rapid spread of tuberculosis is becoming a serious menace." This forecast is supported by the following observations (p. 17) —

Dr Thomson again draws attention to the spread of this disease and bases his opinion on the following statistics furnished him by Capt Hollis, R.A.M.C., at the Carrier Hospital, Nairobi, and by Capt Clark, R.A.M.C., at the Carrier Corps Hospital, Mombasa. The Mombasa figures are large, but as Capt Clark was Tuberculosis officer for Walsall, they may be taken as accurate. An analysis of 328 post mortems performed at Nairobi and 151 in Mombasa gave the following results —

	Mombasa	Nairobi
Acute—lungs	47	32
Chronic became acute	—	12
Chronic fibroid	—	2
Tabes Mesenterica	4	2
Kidney	1	—
Spleen	1	—
Miliary	6	8
	59 = 39.0	56 = 17.0

Tuberculosis to this extent would certainly appear to be a serious menace to a Protectorate the development and prosperity of which is so largely dependent on indigenous labour. Dr MILNE, however, refers to a further cause of labour disability as follows —

One condition which the progress of medical work during the war has demonstrated very clearly is the enormous liability of the African to helminthic affections. Fully three quarters of the native population is infected, and the question of ankylostomiasis alone must have a marked bearing on the labour market. In fact, it is possible that the African lethargy inherent in this tropical region is largely dependent on this cause.

SYPHILIS AND THE BIRTH RATE

The Bunyoro tribe in Uganda practise inoculation of syphilis as a prophylactic measure. Dr STRATHAIRN, Acting Principal Medical Officer of the Uganda Protectorate, produces figures in his Annual Report for 1918 which, in a very marked manner, exhibit the influence of this misguided action upon the birth rate and still births.

Births, Deaths and Rates per 1,000 for Provinces or Districts for which Returns Made, and Percentages of Still-Births to Total Births

1918	Buganda		Busoga		Bunyoro	
Native Populations	803,775		255,686		113,771	
	Births (Living)	Deaths	Births (Living)	Deaths	Births (Living)	Deaths
	10,287	14,160	10,782	9,229	1,649	4,500
Rates per 1,000	12.79	17.61	42.17	36.10	14.50	39.57
Still Births per cent of Total Births and Still Births	1,082=9.52 per cent		669=5.84 per cent		893=35.12 per cent	

REVIEWS

PRIOR (James Chambers) [A M, M D, Medical Inspector United States Navy, Master of Arts in Hygiene Johns Hopkins University, Head of Department of Hygiene, U S Naval Medical School, Professor of Preventive Medicine, George Washington University] **Naval Hygiene** Published with Approval of the Surgeon General U S Navy and by Permission of the Navy Department—vii+307 pp With 153 illustrations 1919 London William Heinemann [Price 12s 6d net]

This book, so the preface states, has been written to help those medical officers whose path of duty lies on the trackless seas and is described as a manual of elementary character. The author has written it on the experience he has gained both as a teacher of naval hygiene and as a follower of the sea in all parts of the world for many years. This is obviously the combination which is necessary for anyone to be justified in setting out to write a book on naval hygiene. He has fully realized how inseparable are the principles of naval from those of general hygiene. For this reason, it will be found by anyone who reads this book that the author in each chapter first gives a general account of the subject and then goes on to show how this may be applied to the special conditions of naval service. Although the author's experience has been gained in the United States fighting Navy, he has not hesitated to draw on experience gained by hygienists in navies of other countries and it is only by this interchange of experience and facts that we can hope to arrive at the perfection aimed at.

The chapters on Ventilation and Heating of ships are commenced by a study of the physics of these problems and it is shown how intimately they are connected with each other. The author concludes that until independent heating and aeration can be accomplished conditions will remain unsatisfactory and insanitary, the thermo tank system, at present in vogue, giving air that is warmed and dried but not humidified.

The chapter on Water goes very fully into the dangers of contamination in ships, the methods of cleansing water tanks and sterilisation of water. The use of sea water drawn from harbours for washing decks and mess tables is deprecated owing to the possibility of food contamination and the length of time before drying takes place. There is a concise description of the bacteriological and chemical standards required in a potable water and the methods of testing for these. These standards do not vary much from those laid down by British Authorities. The question of the artificial lighting of ships is discussed, showing that much is yet to be learnt and done to prevent eye-strain. In the chapter on submarines this is not discussed but it is perhaps more important in this class of ship than in any other. Food supplies, stores, preparation and cooking are considered very fully. The methods of obtaining a sufficient standard diet, which in the U S Navy gives a caloric value of over 4000 per person is described. A special plea is made for Oleomargarine as a substitute for Butter.

There is a complete chapter on the hygiene of parts of the ship and one on the facilities for the care of sick on board, both of which contain many new and enlightening suggestions. The importance of disposal of ship's refuse is emphasised both at sea and especially when in dockyard hands. The author strongly urges that men should not live on board during refits of ships but should be accommodated in barracks. The author includes the usual chapters on accidents and diseases, infectious or otherwise, incidental to sea service in various climates and special mention is made of diving and flying occupations. There is an interesting account of the embalming of dead bodies in which subject it is well known the U S services are much interested. A useful glossary of nautical terms and an appendix on the physical examination of recruits terminate this very useful book. The author is to be congratulated and naval medical officers of all countries are invited to read it.

R St G S Bond

BROOKE (Gilbert E) [M.A. (Cantab.), L.R.C.P. (Edin.), D.P.H. F.R.G.S., Chief Health Officer, Straits Settlements Medical Department, Port Health Officer, Singapore, Lecturer in Hygiene to Singapore Medical School] **Marine Hygiene and Sanitation A Manual for Ships' Surgeons and Port Health Officers**—ix+409 pp With 4 plates & 27 text figs 1920 London Bailliere, Tindall & Cox [Price 15s net]

This book is described as a manual for Ships' Surgeons and Port Health Officers and in the foreword the author points out how limited is the literature on this subject at the present time and how many are the pitfalls before Ships' Surgeons, although fully armed with special health qualifications, at the commencement of their sea career. It is with this apology that he has written this book, explaining that it has no pretence to rank as a textbook.

The book deals mainly with the hygiene and sanitation of the Mercantile Marine but throughout contrasts are ably drawn with similar conditions in the Royal Navy and in the Transport service, so that it may well be read by medical officers of these other services. It commences with an historical review of the mode of entry, status and duties of the Ship's Surgeon both in the Royal Navy and in the Mercantile Marine but the remarks on this matter as regards the Royal Navy are already out of date owing to the recent improvements in pay and promotion. The author passes on to a description of the structure of various types of ships which includes a useful glossary of nautical terms, he insists that a sketch of the ship about to be constructed should be submitted to an expert in public health before the keel is laid down and to this every naval medical officer will agree, he points out that this regulation already exists in France. He has no hesitation in stating that the crew's quarters in more than 50 per cent of British ships are a disgrace to our country and a menace to the health of our mercantile marine. The statement that there are no regulations laid down by the Admiralty as to cubic space necessary either on men of war or on transports is hardly correct as the author would find if he had read the report of the committee on the ventilation of warships: neither can it be agreed to that the location of the ship's sick bay is immaterial so long as adequate ventilation is secured, especially in ships of the Royal Navy. There is a very useful form given for Structural Survey (Sanitary) Figure 6. In the chapters on Ventilation and Water Supply of ships, the author has nothing new to offer but the usual errors and remedies are fully discussed.

Under victualling of ships, the question of causation of Scurvy and Beriberi is very fully discussed and the author inclines very strongly to a bacterial origin in the latter disease, advancing very cogent theories. In the chapters on Quarantine Inspection of Ships and Ship borne Infection the problems that arise and the diseases that may be expected, at different ports of call are carefully gone into and many useful hints to a beginner are given. The danger of gaseous emanations from cargo and stores is described under sanitary inspection of ships, fatal cases are mentioned in men going into closed holds and are described as CO₂ poisoning but from an analysis of air given where the oxygen is only 1.86 per cent death would appear to be due to deficient oxygen (p. 258).

In Disinfection of ships, the author considers that Sulphurous Acid gas is the most useful and recommends the use of the Clayton apparatus which is fully described. The fact that the gas is properly cooled before introduction and condensation thus avoided is regarded as the secret of its excellence. The fumigation of an empty ship is not recommended. The object of rat killing is not to protect the ship but to protect other ports at which infected rats might escape. The duties of the Port Health Officer and his assistant are described and the author draws largely on his own experiences in his advice to such officers, their duties as regards Lighthouses and Lightships are also discussed. Appendices on Drug schedules, Signalling codes, Marine data, and the International Sanitary Convention of Paris are given. The book fulfils its intention and is a valuable aid to Ships' Surgeons and Port Health Officers.

R St G S Bond

SAMEY (M. R.) [M.D. D.P.H., M.O.H.] **Personal Hygiene** —
 vii + 96 pp. 1920. Calcutta: Butterworth & Co. (India) Ltd.
 [Price Rs 3 net.]

This is a cheap book and contains the main principles of good personal hygiene, but it is spoiled by certain unusual forms of English and by certain exaggerated or incorrect statements. These faults could easily be removed. This done, a useful little book would remain.

On page 2 we find it stated that a mixture of protein and other food elements in proper proportions is capable of sustaining life indefinitely. Animals are said to be 'free from disease' in a state of nature. We pass over some other statements which require revision and come to page 80 where we find it recorded that "For instance, a scientific body of France pulverized stone and by the use of electricity produced from the atoms living insects."

There are a few printer's errors in the body of the book and in the index.

Books such as this, written for Indians by those who fully understand their beliefs and customs are greatly needed and we fully agree with the sentence which we now quote from the "Publishers' Note": — "There is no use preaching salutary doctrines which ignore the custom of early marriage, the joint family system, the all pervading scheme of untouchability and superstitious purifications, the conditions of the Indian retail trade in food stuffs, the floor, the cowdung, the ants, the eating leaf, the broomstick, the butter milk, the tropical heat, the scavenger, etc."

J. H. T. Walsh.

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[No 6

SLEEPING SICKNESS

DUKE (H Lyndhurst) Tsetse Flies and Trypanosomiasis Some Questions Suggested by the Later History of the Sleeping Sickness Epidemic in Uganda Protectorate—*Parasitology* 1919, Oct Vol 11 Nos 3 & 4 pp 415-429

The date of commencement of the great epidemic of sleeping sickness on the shores of Lake Victoria is difficult to determine. The attention of Europeans was first drawn to the disease in 1901, but enquiry among the Buganda chiefs revealed the fact that "Mongota," the native name for sleeping sickness, existed previous to this date in an endemic form.

In 1906, Sir H Hesketh BELL put forward a scheme for dealing with the disease. These measures were based upon various assumptions which Duke enumerates. The segregation of the sick was commenced in 1906 and by the end of 1907, the mainland population had been removed inland for a depth of two miles from the coast. During 1908, similar measures were completed in Busoga, and in 1909, in Buvuma and the Sesse islands.

These measures were enforced only within the limits of the Uganda Protectorate. Different policies prevailed in the neighbouring fly areas of German East Africa and British East Africa. The Germans combined deforestation measures with a limited depopulation scheme applied to certain particularly "dangerous" localities. In British East Africa the natives were left in contact with the fly, an attempt to encourage voluntary segregation and isolation from the fly proving abortive.

As a result of these measures the most sanguine hopes were realised as regards the stamping out of the disease in the fly zone of the Uganda Protectorate.

In British East Africa, along the shores of the Kavirondo Gulf, the epidemic apparently worked itself out after causing a very heavy mortality. The disease in this area now appears to be endemic and the population is reported to be again increasing. As regards German East Africa the authorities there described the measures pursued as "completely successful," yet they admit that isolated cases of fresh infection occurred from time to time.

Duke gives most interesting data regarding the number of deaths per thousand of the population for the Buvuma and Sesse Islands during the years 1900 to 1914

Table shewing deaths returned as by sleeping sickness among the Sesse and Buvuma islanders, with estimated number of Islanders and deaths per thousand

Year	Buvuma Islanders			Sesse Islanders		
	Deaths by sleeping sickness	Estimated number of islanders	Indicated number of deaths per thousand	Deaths by sleeping sickness	Estimated number of islanders	Indicated number of deaths per thousand
1900	5,137	56,322	91	789	23,166	39
1901	6,874	51,185	134	1,048	22,377	47
1902	19,049	44,311	428	1,950	21,329	91
1903	5,174	25,262	205	2,549	19,379	132
1904	3,503	20,088	175	2,238	16,830	133
1905	2,585	16,585	155	918	14,596	63
1906	1,001	14,000	71	718	13,578	52
1907	1,314	12,981	99	678	12,960	52
1908	667	11,667	55	506	12,282	41
1909*	258	11,000	23	436	11,776	37
1910	93	—	8	188	—	16
1911	67	—	6	84	—	7
1912	25	—	2	11	—	1
1913	15	—	1	8	—	1
1914	6	—	1	7	—	1

* Year of removal of population

It will be seen from this table that the number of deaths from sleeping sickness in the islands fell steadily from 1902-3 onwards. In 1906 it was not believed that the decline was due to any diminution in virulence of the disease, but simply to the reduction of possible victims in the affected areas, and it was on this assumption that the removal inland of the whole surviving population was decided upon and carried into effect as regards these islands in 1909. The information collected by Duke shows, however, that this hypothesis was incorrect and that the decline of the epidemic previous to 1909 was only in part due to reduction in number of possible victims since the number of deaths per thousand of population declined only a degree less rapidly than the total number of deaths.

As the result of most careful and critical examination of all available information relating to the Uganda epidemic, Duke advances the hypothesis that mechanical transmission by *G. palpalis* from man to man of a virulent strain of *T. gambiense* played a most important part in the production of the epidemic. He points out that the conditions necessary for direct transmission, viz, the presence of many large biting flies and of many potential hosts of the parasite in close juxtaposition were fulfilled in the closely packed canoes of Victoria Nyanza, he adds,

"The riparian population of Uganda possessed many hundreds, probably several thousand, canoes, which were in constant use for fishing and commerce. They also fished, in parties, from fly infested shore, gathered in numbers for repairing canoes, fishing gear, etc., under similar conditions, and finally, there were market places where islanders met mainlanders for exchange of produce, at points on the shore that were well known to be densely and dangerously infested by fly."

The general conclusions are —

"In the preparation of a paper of this character we have had three main objects in view, (1) To call attention to the fact that the bio economic problem created by the tidal wave of sleeping sickness that swept the region of the Upper Nile in general and the shore of Victoria Nyanza especially, is not solved, but that it has merely passed from the stage which called for measures designed to prevent further destruction of life and values into a new stage calling for the substitution of reconstructive for preventive measures. The "main and most important feature" of the measures adopted in Uganda in 1907 was to remove all natives from contact with the fly in order to prevent further spread of the disease and further destruction. The main and most important feature of the reconstruction measures must be to replace the populations and recover economic values, but at the same time to preclude absolutely the possibility of another devastating pestilence. This effort toward reconstruction is in every respect as important and necessary as the effort to prevent further destruction.

"(2) To call attention to the main question raised by the outcome of the preventive measures, with a view to determining future policy. Are we justified in accepting the most obvious interpretation and proceeding to reconstructive effort on the assumption that an epidemic of sleeping sickness is impossible unless there is sufficiently broad contact between fly and population to render possible the development of a virulent 'mechanical transmission,' strain. Or must we take also into account the possibility that the pathogenicity of the trypanosome may be subject, *per se*, to variations, irrespective of the method by which it is transmitted? On this latter explanation the disappearance of acute trypanosomiasis in Uganda is not altogether due to the preventive measures, but also in greater or less degree to diminution in pathogenicity of the parasite and that the trypanosome is liable to resume a virulent state, even in Uganda Protectorate, under existing conditions.

"(3) To present the results of self questioning along these lines, which has resulted in the formation of a working hypothesis supported by considerable negative, but relatively little positive evidence, and which for the present is chiefly valuable as it suggests the need for further specific enquiry.

"Pending the results of such enquiry this hypothesis affords the best answer we can give to what we regard as the main question. It recognises the possibility that *T. gambiense* may vary greatly in pathogenicity to man; it takes into account the manner in which peculiarly virulent strains of normally less virulent species of insect borne trypanosomes are developed. It recognises also the real probability that such strains may develop in nature as well as in the laboratory. It recognises a clear possibility that a peculiarly virulent strain of *T. gambiense* may have been developed in this manner, and, finally, if it could be proved well founded, it would indicate that very broad contact between fly and population is a prime essential to the occurrence of sleeping sickness in the form of a widespread epidemic."

W. Yorke.

TODD (John L.) 1 The After-History of Trypanosomiasis in Africa
 II Concerning Immunity to Human Trypanosomiasis — *New Orleans Med & Surg J* 1919 Nov Vol 72 No 5 pp 291-295

1 Details of 350 natives of the Gambia,* who had been carefully examined by TODD and WOLBACH in 1911, were left with various

* See *Sleeping Sickness Bulletin*, Vol 3, p 338

Travelling Commissioners, these cases had been chosen for examination on account of their enlarged cervical glands, 79 were definitely cases of trypanosomiasis. In one district—the South Bank Province—there were 12 cases of trypanosomiasis in a list of 33 persons examined. At the end of 1918, four of these twelve were still living. About a third of the cases occurring in the remaining provinces were lost sight of, 25 of them had died and, when last reported upon in 1916, three were living. The cause of death was practically always recorded as “sleeping sickness”. The cases living are said to be perfectly well.

ii There is no history, or tradition, of a time when trypanosomiasis was not endemic and universal in the Gambia. In 1911, about 8 per cent of the population was infected, *Glossina palpalis* and *Glossina morsitans* were widely distributed and often very numerous. The manner of living of the Gambian natives does not particularly expose them to the bites of *G. palpalis*, as the villages, grazing grounds and farms are usually some distance from the water, moreover, the people are prosperous and have not been weakened by famine or war. It has, however, long been felt that these factors are not sufficient to explain why only 8 per cent are infected in an area where the disease has been endemic for years and where tsetse are numerous.

There is no evidence that the trypanosome from the Gambia differs in virulence from that responsible for the epidemics of East and Central Africa, and typical cases of ‘sleeping sickness’ of the severest type do occur.

If the Gambian natives possessed a partial immunity, their rate of infection would be low. Against this explanation, however, it has been urged that the cases of infection are most numerous in localities where the population is most subject to the bite of tsetse. Nevertheless, a native in the Gambia can scarcely live to become elderly without having been bitten many times by tsetse which has previously bitten persons infected with *T. gambiense*. That there are elderly natives, suggests that to reach their age they must have resisted a trypanosome infection. In reference to this subject Todd recalls the four cases of trypanosomiasis diagnosed in 1911, and still alive and apparently well in 1918, referred to above. If these cases continue to live without signs of disease spontaneous cure must be accepted as existing, if they develop clinical trypanosomiasis, either from a new infection or from the old one, their history will shew that the disease ran a course so chronic as to justify the statement that these four cases shewed a partial immunity to the disease. It has been maintained that if an immunity existed it was not a sterilising immunity, but rather a tolerant immunity which permitted the existence in the human host of limited and undangerous trypanosome infections, either continued or renewed. The continued existence of health of the above four cases is not discordant with such a view.

The conclusion is—The existence in an endemic area of four cases of trypanosomiasis, seven years after their infection was demonstrated, is additional proof that some degree of immunity to human trypanosomiasis does exist.

WOODCOCK (H M) **New Classification of Trypanosomes A Question of Nomenclature** [Correspondence]—*Lancet* 1920 Feb 21 pp 462-463

This letter is in the nature of a protest against what the author calls such verbal atrocities as "Trypocastellanellae" rather than a criticism of the actual scientific value or accuracy of the classification of trypanosomes proposed by CHALMERS. Woodcock points out that the use of "personal" generic names is objectionable, he asks of what use are the names given to *Theileria*, *Nicolia*, *Nuttallia*, *Smithia*, *Toddia*. Although the introduction of personal names in the formation of new species is perhaps less objectionable, such names as *Prowazekia ninae kohl-yakimovi*, *Trichomonas ninae kohl yakimovi* and *Trypanoplasma ninae-kohl yakimovi*, are not altogether desirable.

The height of absurdity is reached when a personal name and a scientific name are united into one compound word. What, asks Woodcock, does "Trypocastellanellae" mean? Is "Trypo" a contraction of "Trypano" and are we henceforth to think of this tribe of parasites as, primarily, corkscrew shaped, little Castellans? Article 8 of the Code of International Rules of Zoological Nomenclature lays down that the use of proper names in the formation of compound generic names is objectionable.

The author states that, fortunately, some of the new generic names proposed by CHALMERS have no validity. DOFLEIN, in 1901, separated *T. lewisi*, *T. brucei* and other forms from the trypanosome of frogs (*T. rotatorium*), as a distinct sub-genus to which he gave the name *Herpetosoma*. If then the first named forms are now to be regarded as possessing generic rank, the sub-generic name *Herpetosoma* has priority and becomes raised to the rank of a genus. If it is now considered preferable to remove the pathogenic mammalian forms from the genus containing *lewisi* and associated parasites of small rodents, then LUHE's name *Trypanozoon* should be restored for the former. Again, if the trypanosomes of fishes are generically distinct from *T. rotatorium* their name should be *Haematomonas* (Mitrophanow, 1884), and if those of birds are again distinct their generic name should be *Trypanomorpha* (Woodcock, 1906).

The specific name *castellani* is antedated by the name given to the parasite by CASTELLANI himself who called the parasite discovered by him *ugandense*, so that if the separation of this form from *T. gambiense* is adopted, its name would be *T. ugandense*.

[Dr Woodcock has refrained from commenting on the CHALMERS classification as such—possibly he considers he has said enough, but in the reviewer's opinion an almost equally effective attack could be made on the accuracy of the assumptions on which the classification is based*]

W Y

SCHWETZ (J) **La maladie du sommeil dans le Moyen-Kwilu (District du Kwango, Congo belge), en 1918**—*Bull Soc Path Exot* 1919 Dec Vol 12 No 10 pp 798-812 With 1 map in text

In 1918, Schwetz was placed in charge of sleeping sickness work in the Moyen-Kwilu district. During the four months, October 1918

* See also pages 473-4 below

to January 1919, spent in the district, he was occupied in travelling about, visiting 142 villages and examining 19,378 natives

A detailed account of the character of the country is given. The people themselves are backward and miserable, as compared with those of the Nord-Katanga. On his arrival and during the first few weeks of his stay in the Moven-Kwilu, the author was much impressed by the rarity of tsetse. In travelling through Kwilu, between Bulungu and Kikwit, it is necessary to look carefully, in order to find here and there an occasional *G. palpalis*. Other species of *Glossina* are practically absent, *G. tabaniformis* was however found in six places, but only in the smallest numbers. To the south of Kikwit however the state of affairs is different, *G. palpalis* was found not only along practically all the streams examined, but also in almost all the villages visited, furthermore, tsetse were encountered in proximity to almost all the villages, in many places, quite circumscribed and without water, which could be called thickets. The author describes in detail these thickets which are really small pieces of forest 50 to 100, or several hundred square metres in size, they are the old sites of villages. *G. palpalis* was found in all these thickets, sometimes in great numbers, although the thickets are frequently quite isolated and separated from water by more or less considerable non wooded zones. There is no doubt that the existence of *G. palpalis* in these thickets is due to the presence of pigs which, as is well known, exert a special attraction to *G. palpalis*. Pigs are found in all the villages to the south of Kikwit.

As regards biting flies other than *Glossina*, the author found *Haematopota* in very great numbers all over the country, mosquitoes were rare and belonged to the genus *Mansonia*.

The distribution of sleeping sickness was very unequal, the proportion of sick varied greatly, not only amongst different groups of villages, but also in villages of the same group. The results of examination of the population is summarised as follows —

I Region de la Goban Examiné				%
1 Hommes	2,787, dont trouvé malades	280		10
2 Femmes	3,666, „	304		8
3 Garçons	1,581, „	107		7
4 Fillettes	1,233, „	41		3 3
5 Enfants	1,643, „	0		—
Pourcentage général, sans compter les enfants				7 %
„ „ en comptant „ „				6 5 %
II Region du Kwilu Examine				%
1 Hommes	1,292, dont trouve malades	190		9 5
2 Femmes	2,767, „	252		9
3 Garçons	1,387, „	162		12
4 Fillettes	1,276, „	105		8
5 Enfants	1,046, „	3		0 3
Pourcentage général, sans compter les enfants				9 5 %
„ „ en comptant „ „				8 5 %
Pourcentage général des deux régions				
1 sans compter les enfants				8 5 %
2 en comptant les enfants				7 5 %

Regarding the length of time sleeping sickness has existed in this district, nothing definite is known, but probably the disease was introduced at the time of European penetration, viz, about 10 or 15 years ago. The first medical reports on the disease are those of Dr DAVID in 1914-15, who recorded that 20 to 30 per cent of the population were infected. Since the time of Dr DAVID no serious work on the subject has been done in Kwilu. The Kassai Company has no doctor at all and the doctor of the oil plantations has sufficient to do at Leveville.

The paper closes with certain remarks and recommendations regarding prophylaxis.

W Y

SCHWETZ (J) A propos du diagnostic le plus expéditif de la maladie du sommeil dans la pratique ambulatoire de la brousse — *Bull Soc Path Exot* 1919 Dec Vol 12 No 10 p 726

In this paper the author lays stress on the value of gland palpation in the diagnosis of human trypanosomiasis, as compared with microscopical examination of the blood or gland juice for the demonstration of trypanosomes. He points out that the natives, for the most part, object in the strongest manner to the needle; they flee when the medical man comes into the district, and it is only with the greatest difficulty that they can be persuaded to submit to a microscopical examination of the blood or gland juice and then are apt to attribute their subsequent symptoms to the puncture.

Schwetz points out that although a positive result from microscopical examination is definite evidence of infection, a negative result by no means implies that the patient is not affected with the disease. The travelling doctor can examine a population only once and is hence not unlikely to fail in his effort to discover trypanosomes. Schwetz has, therefore, reached the conclusion that gland palpation gives results which are less erroneous than are those obtained from microscopical examination. Furthermore, simple palpation is much more expeditious and much less obnoxious to the native than the latter procedure.

At the beginning of his colonial experience in Tanganyika, the author had recourse to microscopical diagnosis and is now convinced that he passed many as free from trypanosomiasis who were really infected. Later, in the Congo he has had similar proof of the inefficacy of the microscopical method of diagnosis, finding many infected amongst the population of Kikwit who were in possession of a certificate to the effect that their blood and gland juice were negative. Further evidence of a somewhat similar nature is given.

In making a diagnosis by means of gland palpation, it is necessary to distinguish between "typical glands" and "atypical glands." Typical glands, that is glands which are large and soft or elastic, are certainly an excellent means of diagnosis, but of course not free from error, because, in the first place, glands more or less "typical" occur, although rarely, in affections other than trypanosomiasis, and in the second place trypanosomes are sometimes found in glands which are not typical, that is small and hard.

W Y

TEJERA G (Enrique) *La Tripanosomosis americana o enfermedad de Chagas en Venezuela (Nota Preliminar)*—*Gac Med de Caracas* 1919 May 31 Vol 26 No 10 pp 104–108, and *An de la Direccion de Sanidad Nac* Caracas 1919 Jan–June Vol 1 No 1–2 pp 73–84 With 3 text figs [English Translation pp 97–107]

— *Primer caso de Tripanosomosis americana en el Estado Miranda*—*Gac Med de Caracas* 1919 June 15 Vol 26 No 11 p 113, and *An de la Direccion de Sanidad Nac* Caracas 1919 Jan–June Vol 1 No 1–2 pp 85–86 [English Translation p 108]

— *La Trypanosome americaine ou maladie de Chagas au Venezuela*—*Bull Soc Path Exot* 1919 Oct Vol 12 No 8 pp 509–513

Flagellates were found in the intestine of *Rhodnius prolixus* examined by the author in Trujillo, Venezuela. Inoculation of the flagellates into mice guinea-pigs and monkeys gave rise to infection with a parasite indistinguishable from *Schiz cruzi*. Larvae of *Rhodnius prolixus*, bred in the laboratory and fed on infected mice and guinea pigs, exhibited infection with flagellates identical with that found in naturally infected *Rhodnius*. Infected *Rhodnius* were found not only in the State of Trujillo but also in those of Zulia, Merida, and Tachira, and later also in the centre of the republic in the States of Aragua, Carabobo and Miranda. Systematic examination of the blood of febrile patients in the State of Trujillo led to the discovery of two cases of acute American trypanosomiasis and later a case was found in Miranda. It is to be noted that in the regions where infected *Rhodnius prolixus* was found goutre is very frequent. Clinical details of the three cases of human trypanosomiasis are given. Apparently *Concrrhinus megistus* does not exist in Venezuela.

The conclusions are —

1 That American trypanosomiasis, or Chagas' disease, exists in Venezuela.

2 That *Rhodnius prolixus* is the transmitting agent

W Y

ESCOMEL (E) *La trypanosomiase humaine existe dans les forêts orientales du Pérou*—*Bull Soc Path Exot* 1919 Dec Vol 12 No 10 pp 723–726 With 1 text fig

The patient to whom this note relates came from the forested region watered by the river Tahuamanu which, after uniting with the Manuripe, flows into the Beni, this portion of Peru adjoins Brazil and Bolivia. The patient had for a long time suffered from forest fevers of variable duration and intensity. At the time of examination, the condition was afebrile, there was general anaemia and the pulse was feeble. A generalised hard oedema, which did not pit on pressure, was noted. The patient also complained of great lassitude, extreme prostration and attacks of somnolence.

In view of these suspicious symptoms and of the fact that the patient came from that portion of Peru bordering on Brazil where *Triatoma megista* and other vectors of *Schiz cruzi* are found, a careful examination of the blood was made. Thick dehaemoglobinised films were

stained with Giemsa or Leishman. A fairly detailed account of the trypanosome found is given. The total length varied from 20 to 40 μ and the maximum breadth from 3 to 4 μ . The flagellum was always longer than the protoplasmic body. The nucleus was situated about the middle of the body and the blepharoplast was small hardly visible, but always well differentiated.

Taking into account the symptoms exhibited by the patient, the district from whence he came—the centre of the American forest bordering on similar regions in Brazil, where trypanosomiasis is endemic—the author believes that the case was one of Chagas disease and is therefore the first discovered in Peru, in any event, it is the first time that trypanosomes have been demonstrated in the blood of a human being in Peru. Since the discovery of *Triatoma infestans* in the valleys of Vitor and Majes, the author has redoubled his efforts to find other cases, although trypanosomiasis was suspected in some patients, especially in children showing clinical signs, no further demonstration of the parasite has occurred. Escomel states that he was shown an example of *Triatoma infestans* which was captured in the forest region in the north of Peru. There is a somewhat inadequate illustration of the parasite.

[It is impossible to pass over this interesting paper without drawing attention to the fact that this parasite, as described by Escomel, bears remarkably little resemblance to *Schiz cruzi*. The most notable difference is found in the character of the blepharoplast. In *Schiz cruzi*, this structure is very prominent, most usually it is large and ovoid.]

W Y

YORKE (Warrington) **On Human Trypanosomiasis in Peru**—*Ann Trop Med & Parasit* 1920 Mar 15 Vol 13 No 4 pp 459-460

Yorke comments on the size of the trypanosome discovered by ESCOMEL and on the character of the blepharoplast. *S. cruzi* in the blood averages about 20 μ , and never approaches 40 μ , while, as is well known, the blepharoplast of *S. cruzi* is bulky, and cannot be described as scarcely visible. He notes also the overpowering somnolence which, as far as he is aware, has not been noted in American trypanosomiasis. He suggests that the trypanosome is a new species, and proposes for it the name of *Trypanosoma escomeli*.

A G B

SEGOVIA (Juan C) **Une nouvelle Trypanosomiase observée au Salvador**—*Rev Med d'Hyg Trop* 1914 Vol 11 No 2 pp 111-117 (Rec Jan 1920)

The author found a trypanosome in the blood of a patient suffering from fever and an erythematous eruption. The parasites were very scanty and in order to obtain them in sufficient numbers for examination, it was necessary to have recourse to centrifugation of 10 cc of blood. In appearance the trypanosomes resembled markedly *Schiz cruzi* and until further information is available, it is proposed to designate the parasite *Trypanosoma cruzi* var *segovia*.

W Y

MURRAY (W A) Notes on the Successful Treatment of a Case of Sleeping Sickness—*S African Med Rec* 1919 Nov 8 Vol 17 No 21 pp 326-328

An account is given of a case (European) of sleeping sickness which was contracted in Portuguese East Africa during the campaign in October, 1918. The treatment, which was commenced on January 21st, 1919, was as follows—Mondays and Thursdays antimony tartrate gr 1 to 2, intravenously, Tuesdays and Fridays soamin grs 3, intravenously, Wednesdays, Saturdays and Sundays solution of antimony oxide, Martindale, 2 cc ($\frac{1}{8}$ of a grain), subcutaneously, at first—later the strength of the last was increased and as much as $\frac{1}{8}$ of a grain was given intramuscularly. After eight months treatment, the patient was looking and feeling well.

Attention is drawn to several special features of the case. The incubation period was a week or less. This coincides with that observed in four or five other European patients from whom reliable dates of infection and first symptoms could be obtained. In several of the author's cases there was a definite relation between the locality of the bite and the glands most swollen. The trypanosomes were polymorphic and the posterior nuclear forms were seen in subinoculations but were not common (rabbits and guinea-pigs only were used). A periodicity in the numbers of parasites in the cutaneous blood was observed.

W Y

REICHENOW (E) Die Grundlagen für eine Therapie der Schlafkrankheit [Fundamentals in the Therapy of Sleeping Sickness]—*Deut Med Woch* 1914 Dec 3 Vol 40 No 49 pp 2035-2038 [Received Feb 1920]

It is known that the number of trypanosomes in the blood undergoes periodic variations, the parasites increase in number till a maximum is reached and then quite suddenly disappear. The cause of the disappearance is probably to be sought in the formation from time to time of active antibodies. It is to be noted that the highest temperature corresponds, as a rule, not to the time of maximum concentration of trypanosomes in the blood, but to a time shortly after their disappearance. Probably in many cases the parasites are not completely cleared from the blood, in any case they return possibly from the lymphatic glands as they are often found in gland juice at a time when they are not numerous enough to discover in the blood. After a time—as a rule not before the lapse of several months—trypanosomes appear in the cerebro-spinal fluid, and the condition of sleeping sickness is reached. The number of trypanosomes found in 12 cc of cerebrospinal fluid varies greatly in different cases, sometimes it is over a thousand, at other times it is only one or two. The number of parasites in the spinal fluid does not, however, show periodic variations as in the blood, but in the same case remains practically unchanged for months. The greater the number of trypanosomes in the spinal fluid, the greater the somnolence. Even when only one or two trypanosomes are found in 12 cc of spinal fluid, there is always a great increase of lymphocytes. As this condition is found also in syphilis, it is not of much use as a means of positive diagnosis, but has, however, great negative value.

It was found that courses of atoxyl or salvarsan, although they cleared the blood of trypanosomes, did not cause any reduction in the number of parasites in the spinal fluid. Reference is made to the fact that ENGMANN and others failed to find arsenic in the spinal fluid 48-98 hours after the administration of neosalvarsan in four cases of syphilis.

The author believes the blood becomes reinfected with parasites from the cerebro-spinal fluid, he injected infected human blood into the spinal canal of a monkey and found trypanosomes in the blood twenty-one days later.

Attempts to clear the cerebro-spinal fluid of trypanosomes can be made in two directions: firstly, the introduction into the spinal canal of preparations known to be toxic to trypanosomes and, secondly, the search for substances which in addition to acting on trypanosomes are capable of being taken up by the nervous system. Following the first of these two lines of research, the authors subjected a number of cases in the second stage of the disease to the following procedure—Two to three hours after an intravenous injection of neosalvarsan an amount of blood sufficient to produce about 10 cc of serum was withdrawn. After clotting the serum was removed from the clot and after mixing with a little water containing 0.4 gm of neosalvarsan was injected into the spinal canal, at least 10 cc of cerebro-spinal fluid having been previously withdrawn. No ill effect followed this administration when the dose of neosalvarsan given intraspinally did not exceed 0.4 gm, but on one occasion blindness resulted when the injections were repeated a week later. Of the therapeutic value of the method it is too early to speak. In reference to the second line of research observations were made on the effect of alcohol which is known to pass into the spinal fluid. The patients were given orally about 200 gm of alcohol, either on each of three consecutive days or on three alternate days, spinal punctures showed that although the trypanosomes did not completely disappear they decreased greatly in numbers as a result of this procedure, but they soon increased again to their former number. Encouraged by the result of these investigations, the author proposes to make further experiments in this direction with other alcohols (methyl alcohol) and with other nerve poisons.

W Y

MAYER (Martin) *Klinische Beobachtungen aus der Krankenabteilung des Instituts für Schiffs- und Tropenkrankheiten* [1 Trypanosomiasis (Schlafkrankheit)]—*Arch f Schiffs u Trop-Hyg* 1916 Nov Vol 20 No 21 pp 471-482 With 1 curve

An account is given of the treatment of two cases of human trypanosomiasis.

The first case, Mr X, contracted the disease in the region of Romangu on Lake Tanganyika in June, 1913. Numerous trypanosomes were found in the blood and he was immediately subjected to a course of treatment of atoxyl injections and mercury injections. Later salvarsan, tartar emetic and quinine were given. The patient was admitted to the Hamburg Institute in December, 1913, his blood contained many trypanosomes and galyl was given. The parasites

disappeared from the blood, but soon returned again, a treatment consisting of salvarsan copper and trypanblue was then tried, but with no success. On 10th March, 1914, a prolonged course of tartar emetic treatment was commenced, the drug in doses of usually 0.8 to 1 gm was given every five days with intervals of varying duration every now and again until 11th October, 1915. The dates of administration of the drug and the amounts given are shown in a table. The blood of the patient has been negative since 20th May, 1914, and inoculation in monkeys did not cause infection. The last examination was on 28th August, 1915. A spinal puncture made on 14th September 1915, gave clear fluid and finally the temperature has remained normal since the beginning of the tartar emetic treatment.

The author points out that little is known of the general effects of tartar emetic. It is necessary to distinguish between the acute and the chronic effects. Within a few minutes of an injection of 0.8 gm dyspnoea was observed, this was accompanied by redness of the face. In most patients this was all that occurred, in some, however nausea or even vomiting followed, but lasted only a few minutes. In the evening and on the day following the injection there was sometimes headache and, especially after repeated injections, pain between the shoulders and in the muscles of the upper arm. Details are given of the symptoms produced in two cases by tartar emetic injections. Local reactions at the site of the injections were not observed.

As regards sub acute and chronic symptoms of antimony poisoning little is known. ROBERT and SCHÄFFER describe changes in the central nervous system. How far slight nervous symptoms exhibited by Mayer's patients were due to antimony and not to the disease it is difficult to say.

Details are given regarding a second case of trypanosomiasis who contracted the disease in the Congo in May, 1914. He was treated with atoxyl and admitted to the Hamburg Institute in July, 1914, for further treatment, but he was so well that this was unnecessary and he was able to join the army on the outbreak of war. On 29th June, 1916, he came under observation again, but apart from two enlarged neck glands puncture of which was negative, nothing abnormal was found. Mayer, therefore, regards this patient as cured.

It is interesting to contrast these two cases—the one arsenic resistant and cured by tartar emetic, and the other rapidly cured by arsenic.

W Y

TANON (L) & DUPONT (A) *Le traitement de la maladie du sommeil par le Galyl (1116)*—*Rev Med d'Hyg Trop* 1914 Vol 11 No 2 p 84-97 (Received January 1920)

Reference is made to a previous communication on the therapeutic value of galyl and ludyi [this *Bulletin*, Vol 2, p 353]. In the present paper the authors record further observations which confirm their earlier ones on the efficacy of these drugs.

After some remarks on the chemistry and toxicity of the drugs, an account is given of certain observations made on experimentally infected animals. Animals infected with *T. gambiense* are cured in

two or three hours after subcutaneous injection of the drugs in doses of 0.01 gm per 10 gm in the case of the mouse, 0.2 gm per 100 gm in the case of the rat and 1 gm per kilo in the case of the monkey. These quantities approximate to the lethal dose. The mechanism of the disappearance of the trypanosomes from the blood of the living animal and the action of the drugs *in vivo* are discussed in detail. After smaller doses than the above, relapses are sometimes observed.

The therapeutic action of the drug in human trypanosomiasis was examined in Senegal in the Petite Côte region. Details are given of five of the cases so treated. The authors state that galyl or ludyl alone, or in combination, appear to cure sleeping sickness. The doses used were 0.1 gm dissolved in 3 cc of serum containing 15 per cent of sodium carbonate, per kilo of body weight, injections were given every eight days. The treatment is easy to give and is well tolerated by the patients except for occasional vomiting and diarrhoea due to alkalinity of the serum, it produces no ill effects.

Galyl and ludyl cure patients in the first and second stages of the disease, in the third stage, the progress of the disease is retarded, but not arrested.

W Y

DANIEL (Gaston) *Arsenic et Trypanose Argument—Scalpel* 1919
Aug 24 No 15

In this paper the author gives a brief historical summary of the results obtained by a number of investigators with different preparations of arsenic in the treatment of the various trypanosomiasis of man and animals. He contrasts the action of arsenic and of iodosalyl [this *Bulletin*, Vol 15, p 43], and points out that although the former cannot be found in the spinal fluid, yet the latter can be detected in this fluid half an hour after injection. Although atoxyl, and other arsenical preparations, and emetic sterilise the blood their curative power is anything but proved. Iodosalyl acts quite differently in that it follows the trypanosomes into the depths of the tissues, thus assuring their definite disappearance.

W Y

VAN DEN BRANDEN (F) *Essai de traitement de la Trypanosomiasis humaine par la colloïdase d'antimoine—Bull Soc Path Exot*
1920 Jan Vol 13 No 1 p 27

The therapeutic value of colloidal antimony was examined in two cases of human trypanosomiasis. The drug used was that of DAUSSE of Paris. The first case received 14 ampoules in three days and the second 15 in a similar period, in neither did the trypanosomes disappear from the blood.

W Y

CITRON (H) *Ueber die Einwirkung des Mesothoriums auf Trypanosomen* [The Action of the Rays of Mesothorium on Trypanosomes]—*Zeitschr f Immunitätsf u Experim Therap* 1918
Vol 27 No 5 pp 369-373 [Summarised in *Bull Inst Pasteur* 1920 Feb 29 p 131]

The author has repeated the work of HALBERSTADTER on the action on trypanosomes of the γ rays of mesothorium (the β rays having been absorbed by an aluminium plate) [this *Bulletin*, Vol 3,

p 414] He used a strain of Nagana which was very virulent for rats and mice. The author concerned himself in the first place in keeping alive trypanosomes as long as possible in diluted blood, and for this purpose he used as a diluent, extract of liver, serum of the guinea pig rabbit, citrated plasma of the rabbit, or plasma obtained by the use of leech extract. In the second place, he performed experiments to ascertain the action of the rays on very thin layers of the diluted blood.

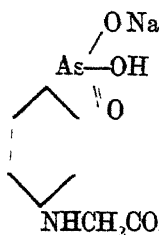
The author worked with dilutions so great that the control animals became infected only after ten days. The mice or rats inoculated with diluted blood subjected to the action of the rays for several hours always developed a fatal infection, but after a longer latent period than the controls.

He determined that the substance in the serum or plasma which prolongs the life of the trypanosomes is dialysable, but he was unable to extract it by alcohol.

W Y

- i JACOBS (Walter A) & HEIDELBERGER (Michael) **Chemotherapy of Trypanosome and Spirochaete Infections Chemical Series I N Phenylglycineamide-*p*-Arsonic Acid**—*Jl Experim Med* 1919 Nov 1 Vol 30 No 5 pp 411-415
- ii BROWN (Wade H) & PEARCE (Louise) **Biological Series I The Toxic Action of N Phenylglycineamide-*p*-Arsonic Acid**—*Ibid* pp 417-436
- iii PEARCE (Louise) & BROWN (Wade H) **Biological Series II The Therapeutic Action of N Phenylglycineamide-*p*-Arsonic Acid in Experimental Trypanosomiasis of Mice, Rats, and Guinea-pigs**—*Ibid* pp 437-453
- iv ——— & ——— **Biological Series III The Therapeutic Action of N Phenylglycineamide-*p*-Arsonic Acid in Experimental Trypanosomiasis of Rabbits**—*Ibid* pp 455-481 With 21 plates

1 For a number of years, the authors in conjunction with BROWN and PEARCE have been engaged in the synthesis of certain new types of organic arsenic compounds for the treatment of experimental trypanosome and spirochaete infections. Attention was first directed to the production of compounds containing arsenic in the pentavalent form as presented by the arsonic acids. A number of substances were prepared and one of them, the sodium salt of N phenylglycineamide-*p*-arsonic acid



demands special attention on account of its simplicity, the ease with which it is prepared, its relative inexpensive character, its stability and solubility, and its favourable biological behaviour. An account is given of the method of preparation, and of the physical and chemical characters of this substance.

The conclusions reached by BROWN and PEARCE in their three biological papers are as follows —

ii "The essential facts to be gathered from these studies of the toxicologic action of N phenylglycineamide p arsonic acid may be summarized very briefly. The substance is one which lends itself well to almost any method of administration and can be given to animals in very large doses. The tolerance of different animal species varies rather widely but with one exception the reaction of laboratory animals to toxic doses of the drug is of favourable character. That is, toxic effects are confined to doses relatively close to the minimum lethal dose and the recovery of animals from sublethal intoxications is remarkably rapid and complete. This feature of the action of the drug makes possible the repeated administration of even very large doses at comparatively short intervals of time without incurring the dangers incident to cumulative action or to superposition of toxic effects. On the contrary, by taking advantage of this peculiarity of action, it is possible to develop such a degree of tolerance on the part of animals that the dose of the drug administered can be progressively increased to a point well above that which is fatal to the normal animal, and this stands out as the feature of the toxicologic action of N phenylglycineamide p arsonic acid which is of greatest significance in the use of the drug for therapeutic purposes."

iii "N Phenylglycineamide p arsonic acid is an agent of marked therapeutic action in the treatment of experimental trypanosomiasis of mice, rats, and guinea pigs. It possesses an average curative range of from 0.2 to 0.3 gm. per kilo of body weight of the sodium salt against a 24 hour infection in mice and rats produced by several species of pathogenic trypanosomes. Since the lethal dose for mice is from 2 to 2.25 gm. and for rats 0.75 gm. per kilo of body weight, we have curative ratios of 1:8 and 1:3 respectively. The curative dose for guinea pigs is 0.15 gm. per kilo of body weight, thus giving a curative ratio of 1:10. The trypanocidal activity of this compound is relatively rapid in all three animal species, for the peripheral blood is cleared of organisms within 24 hours after its administration, and in addition, the lower limits of the curative range are comparatively sharply defined. Intraperitoneal, intravenous, and subcutaneous routes of administration for all practical purposes may be considered equally efficacious in *Tr. brucei* infections of mice both as regards the speed of action of the drug and the average curative range. The administration of the drug in therapeutic amounts in all three animal species is not followed by manifestations of organic or functional injury but, on the contrary, the general physical condition of the treated animals shows an immediate and continued marked improvement."

"The therapeutic activity in trypanosomiasis of mice, rats, and guinea pigs as evidenced by the relative speed and sharpness of action, together with the curative ratio as expressed in fractions of the minimum lethal dose and the absence of organic injury or functional disturbance following therapeutic doses are significant and characteristic features of the amide of N phenylglycine p arsonic acid."

iv "In the treatment of experimental trypanosomiasis of rabbits with subsequent appraisal of the value of the therapeutic agent used, there are certain experimental factors including uniform infecting strains of trypanosomes and the observation of general procedures of method and time of inoculation conditioned by the infection itself which must be taken into account. The conspicuous and characteristic clinical signs and symptoms seen in rabbit trypanosomiasis serve as criteria of the severity and duration of the disease, and it is obvious that the infection should be well established before treatment is instituted. For the same reason, before the question of a permanent cure can be established, treated rabbits should be kept under observation for a sufficient period of time, which with the species of organisms that we have used is at least three months."

"The therapeutic results with the amide of N phenylglycine p arsonic acid were obtained in rabbits which showed well marked clinical signs of a definitely established disease, and in many instances the infection was extremely advanced and of prolonged duration. The five species which we have employed, *Tr. brucei*, *Tr. gambiense*, *Tr. equinum*, *Tr. equiperdum*, and *Tr. evansi*, are uniformly fatal in rabbits. With the usual acute,

actively produced infection of from 1 to 2 weeks duration produced by our strain of *T. brucei* the drug has a curative range of from 0.2 to 0.35 gm. per kilo of body weight, when administered intravenously in single doses or from one third to one half the minimum lethal dose. Of the twenty-nine rabbits treated with doses falling within this range twenty-five, or 86 per cent, were permanently cured and there were no relapses observed with doses above 0.3 gm. The infection produced by our strain of *Tr. gambiense* is controlled by a slightly lower dose since there were no relapses with single doses of 0.3 gm. and a single dose of 0.15 gm. effected a cure in one of three rabbits so treated. The therapeutic experiments with *Tr. equinum*, *Tr. equiperdum* and *Tr. canis* are too few to admit of final conclusions, but apparently from the evidence at hand, much the same curative range is operative in *Tr. canis* infections while larger doses or a different system of treatment should have been employed in the treatment of rabbits infected with our strain of *Tr. equinum* and *Tr. equiperdum*.

In addition to the ultimate curative results obtained with single doses within the curative range it is important to consider the marked therapeutic action with smaller single doses as shown by the rapid regression and healing of the clinical lesions of the acute infections produced by all five species of trypanosomes together with a marked improvement in the general physical state of the animal. Moreover large single doses above those of the so-called curative range caused no disturbance of a toxic nature and were apparently well borne.

A system of repeated dose therapy may be employed with advantage in the treatment of both initial and relapsed infections in rabbits, especially in those instances in which there is induration or necrosis of tissues with weakness and emaciation of the animal host. The factor of time of repetition or the spacing of doses is in our experience as important as that of size of the dose employed and depends upon the rate of give and duration of action of the particular dose of the drug in question. Since the amide N-phenylglycineamide p-arsonic acid apparently possesses the power of tissue penetration to a marked degree it is desirable to give the second dose within a short time after the first in order that it may have a full opportunity for the immediate and complete development of its action. The repetition of small doses such as 0.15 gm. per kilo of body weight on successive or alternate days has given successful results as regards both the immediate regression and healing of lesions and ultimate permanent cures in severe, chronic infections. It is possible, however to administer increasingly large doses if this is necessary since infected as well as normal rabbits exhibit a remarkable tolerance to repeated large doses of the drug. The therapeutic activity of small doses administered intramuscularly is quite comparable with that observed at similar doses given intravenously as indicated by the rate of regression and healing of clinical lesions while such effects proceed somewhat more slowly after subcutaneous injections. Permanent cures have been obtained in *Tr. brucei* infection with intramuscular and subcutaneous administration of single doses of from 0.2 to 0.5 gm. of the drug per kilo of body weight and in other instances with three repeated doses of 0.1 gm. per kilo given intramuscularly. One severely infected rabbit which received 0.75 gm. per kilo per os immediately following a small dose of sodium bicarbonate was also cured.

The therapeutic experiments here reported represent only a portion of those carried out with N-phenylglycineamide p-arsonic acid and the scope of the present paper does not permit a detailed description of the many phases of the experiments or a full discussion of the various factors involved and the results obtained, all of which we hope to publish at some future time.

W Y

VAN DEN BRANDEN (F) Action de la combinaison atoxyl émétique trypanosan, sur le *Trypanosoma congolense*—*Bull Soc Path Exot* 1919 Oct 8 Vol 12 pp 514-517

An intensive course of atoxyl-emetic exerted a favourable effect on the general condition of cattle infected with *T. congolense*, but did not

cause the definitive disappearance of parasites from the blood. The addition, however, of trypanosan in doses of 26 gm per kilo of body weight produced sterilisation of the blood for 3 months—possibly definitively—after cessation of treatment. The atoxyl and trypanosan were given by the mouth and the emetic intra-muscularly

W Y

LAFONT & DUPONT Action comparée de l'Atoxyl, du 606, du 914, du Galyl, du Ludyl, et du 4,000, sur *Tr. cazalbour*, in Vitro — *Rev Med d'Hyg Trop* 1914 Vol 11 No 2 pp 100-102 [Received January 1920]

The strain of *T. cazalbour* in these experiments was obtained from a goat experimentally infected by infective *Glossina*. It was found that *in vitro* the action of atoxyl on *T. cazalbour* was nil, neosalvarsan exerted some effect, but much less than galyl, ludyl and 606. Of the last three drugs, ludyl and galyl acted slightly more than '606' the action of '4,000' was much superior

W Y

CROVERI (Paolo) Osservazioni sulla biologia della *Glossina pallidipes* della Somalia Italiana e sulla trasmissione agli animali domestici della Tripanosi detta "Ghendi" [Notes on the Biology of the *Glossina pallidipes* of Italian Somaliland and on the Transmission to Domestic Animals of the Trypanosomiasis known as "Ghendi"] — *Ann d'Igiene* 1919 July 31 Vol 29 No 7 pp 432-447.

Trypanosome infection is very rife among domestic animals in Italian Somaliland, especially among bovines and camels, and causes very serious loss. The first published observations on the trypanosomiasis of Italian Somaliland were those of MARTOGGIO (1911). He referred the forms studied to three types — (1) *Ghendi* caused by *Trypanosoma somalense* (a new species distinguished by MARTOGGIO from *T. dimorphon* owing to its having no pathogenic effect on rabbits) transmitted to domestic animals by the bite of *Glossina pallidipes*; (2) *Gobiat* or *gumil* caused by *T. celli*, whose invertebrate host is at present unknown; (3) *Salaf* or *ducun* caused by a trypanosome which MARTOGGIO identifies with *T. evansi*, the causal agent of Surra.

The author sums up as follows the results of his observations on *ghendi* and on the habits and biology of *Glossina pallidipes* its transmitter —

1 All the glossinae found along the course of the middle and lower Uebi-Sebil in Italian Somaliland belong to the species *pallidipes*.

2 The *pallidipes* transmits to our domestic animals the trypanosomiasis known among the Somalis as *Ghendi*.

3 After the infecting meal the fly does not at once become capable of transmitting the infection to a healthy animal. A period of 17-19 days must elapse, during which the trypanosome probably passes through certain stages of development in the body of the fly.

4 In nature the localities preferred by the *G. pallidipes* are those covered by low shrubs and in the proximity of stagnant or slowly running water. Such localities, limited in number during the dry season, undergo a notable extension in the period of rains with corresponding extension of the infested zone.

5 Open spaces and areas where Graminaceae, cotton or sesame are cultivated are absolutely avoided by the fly. Banana or rubber plantations, however, and, in general, those consisting of low trees or shrubs may become infested.

6 Ordinarily, on sunny days, the *G. pallidipes* bites from dawn till about 8 a.m. It reappears about 4 p.m. to retire again at nightfall. On cloudy rainy days it may bite all day.

7 On moonlight nights the fly bites if disturbed by loud noises or by the shaking of the bushes on which it rests. On dark nights it does not bite.

8 Myrrh in solution has no power to repel the fly. Our experiments would seem rather to shew that it attracts it.

9 The duration of life of the fly is about 3 months. The period of pupation is 28 days at a temperature of 28°C.

F. S. Arnold

DELANOE (P) *Un cas d'infection spontanée du chien par T. maroccanum* Sergeant, Lhéritier et Belleval 1915—*Bull. Soc. Path. Exot.* 1920 Jan 14 Vol 13 No 1 pp 23-26

In August, 1919, Delanoe found trypanosomes in the blood of an adult dog in the Souk-el-Khemis of the Zemamra. The dog was emaciated and had double keratitis. Investigation showed the parasite to be *T. maroccanum*. Trypanosomiasis in dogs is rare in the district of Doukkala and this is the first occasion on which a dog has been found naturally infected with this parasite.

W. Y.

STEAROVEN JR (J. H. Schuurmans) *Die Teilung der Trypanosoma brucei* Plummer u. Bradford [The Division of *T. brucei*, Plummer and Bradford]—*Arch. f. Protistenk.* 1919 Nov 20 Vol 40 No 2 pp 158-180 With 2 plates

A summary is given of the work of previous authors on the division of trypanosomes and on the parts played in this process by the nucleus and blepharoplast.

Various methods of fixation and staining were used by the author in his researches, but the best results were obtained with blood films fixed while still wet in warm Schaudinn's fluid (sublimated alcohol-acetic acid) then treated with alcoholic iodine and sodium thiosulphate solution and stained with saffranin-lichtgrün. The following details are given—"After wet fixation the preparations were hardened over night in 70 per cent alcohol, then stained for 24 hours in a concentrated watery solution of saffranin, rinsed in 30 per cent alcohol and then passed up the alcohols sufficiently quickly to prevent decolourisation. From absolute alcohol the preparation is transferred to a saturated solution of lichtgrün in absolute alcohol, after 30 to 40 seconds it is rinsed in absolute alcohol and mounted in Canada balsam after passing through organum oil."

The remainder of the paper consists of a detailed description of the various processes observed to take place in the body, nucleus, basal granule, blepharoplast and flagellum during division of *T. brucei*. The following is a summary of the conclusions reached—

1 Division of the trypanosome nucleus is a promitotic division with the formation of a division spindle out of the locomotor and generative elements.

2 The blepharoplast lies on the wall of a vesicle, which is always present, and divides by simple fission

3 On, or in, the wall of the blepharoplast vesicle lies the basal granule which likewise divides by simple fission

4 The blepharoplast and basal granule do not exhibit the same division rhythm, similarly the blepharoplast and nucleus exhibit differences in this respect

5 The blepharoplast does not represent a second locomotor nucleus but very probably is to be regarded as a sensory centre which provokes the flagellum to movement

6 Moreover, the system, blepharoplast basal granule flagellum undulating membrane, which should be regarded as a single organ, give to the trypanosome body its particular form

7 The second flagellum always arises as an outgrowth from the newly formed basal granule

8 Occasionally the so called "involution forms" are found in *T. brucei*

W Y

STEVENSON (A C) **Presence of Trypanosomes in the Young of Infected Animals** [Correspondence]—*Jl Trop Med & Hyg* 1919 Nov 15 Vol 22 No 22 p 212

A note confirming BASSETT-SMITH's observation on the passage of *T. rhodesiense* through the placenta in rats [see this *Bulletin*, Vol 15, p 47] Sections of a foetal rat (nearly full time) show trypanosomes universally present throughout the foetus, but most numerous in the spaces in the areolar tissue

W Y

- 1, TEICHMANN (E) Glossinen und Trypanosomen—*Deut Med Woch* 1916 Nov 23 Vol 42 No 47 pp 1437-1440
- 11 ADAMS (Harold B) A Case of Trypanosomiasis—*Jl Amer Med Assoc* 1919 Nov 29 Vol 73 No 22 pp 1696-1697 With 2 text figs
- 111 CUMSTON (Charles Greene) Clinical Notes from France Sleeping Sickness—*New York Med Jl* 1919 Sept 27 & Nov 1 Vol 110 Nos 13 & 18 pp 550-551, 720-721

1 This paper is an interesting summary of knowledge on the inter relationship of trypanosomes and Glossina. It contains nothing new

11 A clinical account of a patient (white) who contracted sleeping sickness in Sierra Leone

111 In these two articles, which contain nothing new, a brief general account of sleeping sickness and its treatment is given

W Y

MALARIA

PAISSEAU (C) & HUTINEL (Jean) Consideration sur la Parasitologie clinique du Paludisme—*Paris Med* 1920 Jan 31 Vol 10 No 5 pp 91-99 With 1 chart

During more than a year's residence in Morocco the authors ascertained that the curves of the incidence of *P. falciparum* and *P. vivax* respectively closely follow those observed in Macedonia [See this *Bulletin*, Vol 10, p 154] From March to June ague is due to *P. vivax* almost exclusively. The *P. falciparum* curve begins to slope upwards and attains its maximum in the period September to December, 90 per cent of the infections being due to *P. falciparum* in December. Seven per cent double infections were found in December and ten per cent in January. It was usually the *P. vivax* which determined the ague attack in these cases. Quartan ague was not observed. They have noted the persistence of crescents for two months without any examination of the blood being negative, but generally they have been few or absent after six weeks. Disappearance of the crescents does not guarantee freedom from a subsequent attack. Ague seizures were not infrequent during the month after the date of the negative blood examination. Sometimes a sudden decrease in the number of crescents was observed immediately before an access of fever. On the other hand, in one case they became much more numerous on the day after an intravenous injection of quinine. A patient in whose blood crescents and schizonts had been found on several occasions had an ague attack, after which the gametocytes disappeared while eight consecutive examinations conducted during a month disclosed schizonts, but he suffered from no recurrence of fever in this period. A man who was taking one gramme of quinine daily for a month harboured all this time gametocytes, schizonts, and rosettes of *P. vivax*. The quinine apparently arrested a febrile access, which, however, came on when the drug was suspended. In studying the action of quinine on the malaria parasites they have noted that the rings of *P. vivax* often assume a *P. tenue* form two hours after an intravenous injection of 0.8 gm. of quinine, but they met with one case of severe ague, untreated with quinine, which was associated with the presence of *P. tenue* in the blood. They believe that their observations show that quinine has an influence in expelling the plasmodia from the red corpuscles. The intravenous injection of 0.8 gm. of quinine greatly diminishes the number of schizonts, and another intravenous dose of 0.4 gm. 8-10 hours later causes the disappearance of all asexual forms from the blood, and also a reduction in the number of gametocytes as a general rule. Thus the intravenous administration gives as good results as intramuscular injections of much larger doses.

SEARLE (Charles) Bilharziasis and Malaria during the Palestine Campaign *Jl Roy Army Med Corps* 1920 Jan Vol 34 No 1 pp 15-34 With 1 map in text

The 1/4 Northamptonshire Regiment had been free from ague while it was encamped at Kubri in the arid Sinai Desert, 8 miles N E of Suez, with the exception of two officers who had occupied a hut where two *A pharoensis* were captured. These had been brought in the water barges. In February 1918 the battalion took up a position on the river Auja. This river empties itself into the sea four miles north of Jaffa. It rises in a number of small springs which abound with anopheline larvae. By April the wadis Lejja, Raba, and Ischar which flow into the Auja dry up, and during the hot weather consist of chains of pools surrounded by high grass, and swarming with larvae. In the eight square miles in which our troops were encamped, in addition to these breeding places there was a marsh 400 yards square, the Abuzeitun marsh, covered with sedge, and here mosquitoes were more numerous than elsewhere. The whole district is highly malarious and the inhabitants fever-stricken. The author believes that the line of the Auja could not have been held without a most strenuous anti-mosquito campaign. The anophelines which were identified were *A sinensis*, *algeriensis*, *maculipennis*, *mauritanus*, *pharoensis*, *pales tinensis*, *fragilis*, *bifurcatus*, and *turkhardi*. At the end of January 1918 the water of 35 wells and 36 cisterns at Mulebbis, a prosperous Jewish settlement, and Wilhelma, a German colony, contained no anopheline larvae, though 26 per cent of the wells at Sarona, nearer the coast harboured them. Breeding did not commence until a month later. The cisterns excavated in the limestone east of the Ludd-Tulkaram line—some of them with a capacity of 28,000 gallons—were breeding culex and anopheles. The adult mosquitoes swarmed at the mouths of these wells and cisterns, the openings of which were sometimes hidden. Some of the anopheline larvae were of bright green colour, but they could not be studied since they were so delicate that they did not survive removal from the pools. It was noted that the most prolific breeding place in Mezeirah was a well in the middle of the village the water of which was very foul. The larvae of anopheles, culex, and *Theobaldia longiareolata* were there quite unaffected by the presence also of a dead Turk. Anopheline larvae however, died in cow's urine in which culicine thrived. The capture of mosquitoes in houses was effected by searching with a flash lamp and entrapping them in a shaving soap box at the bottom of which was cotton wool moistened with chloroform.

Mosquitoes did not breed in orange grove wells in which were rotting oranges which caused an oil-film on the surface.

A Divisional Anti-mosquito officer supervised the work of the Brigade Sanitary Officers, under each of whom was a squad of 12 trained men, provided with two buckets, 100 feet of rope, 6 hand-syringes, 6 enamelled ladles, paraffin and green oil. Wells not used for drinking were sprayed every 7 days with equal parts of paraffin and green oil. If used for drinking paraffin alone was applied. Drip cans were not efficient. Canalization, clearing of banks, filling in pools and shell-holes and the drainage of the Abuzeitun marsh—a great undertaking—were other protective measures. The Jews had succeeded in

draining a swamp by planting eucalyptus trees. Quinine was not given to the troops except to ague convalescents who were subjected to a course of 60 grains a week for three months. Anti mosquito ointment was useless. In June 1918 mosquito bivouacs for every two men were provided. The troops were billeted a mile from villages. Malaria was kept in check while holding the Auja line, but on the advance into Syria in September 1918, the epidemic decimated our troops. The writer insists on the necessity of all ranks being instructed in the prevention of tropical diseases, and on the continual vigilance required for the proper maintenance of the protective measures.

C B

CHARPENTIER (P J L) *Note sur le Paludisme d'Afrique—Arch Méd et Pharm Nav* 1920 Feb Vol 109 No 2 pp 117-122

Among sailors returning to France the type of malaria is most severe in those who have served on the West Coast of Africa from Dakar to the Congo. Three German prisoners, however, from the marshy districts of Poland were highly cachectic. Many of the sailors from the African Coast are profoundly anaemic and liable to frequent relapses notwithstanding the routine treatment with quinine and arsenic (doses not given). Their febrile attacks are atypical. Rigors and the sweating stage are absent. The onset, which almost invariably comes on in the afternoon or evening, is sudden. Violent headache, tendency to syncope, features drawn, tongue dry, very white and red at the edges, hiccough and bilious vomiting, temperature 104°F, are the chief symptoms, which continue for one to two hours. Vomiting then ceases and the fever and headache become less. In about six hours the patient's head no longer troubles him and he falls into a sound sleep. Next morning he feels well, but at the same hour in the afternoon he is again seized and passes through the same cycle of symptoms, and so on for four days. On the fifth day he is very weak and bloodless, and his spleen is much enlarged. The author has for several months employed 1.5 grams of tannic acid with 0.75 gram of quinine daily in the treatment of these cases with much success, reducing the amounts by one third after three days. At the end of another four days he replaces the quinine by sodium cacodylate, and still further lessens the amount of tannic acid. The number of cases is not stated.

C B

GHIRON (V) *Sulla malaria latente—Ann di Med Nav e Colon* 1919 July-Aug 25th Year Vol 2 No 1-2 pp 589-593

During the latter half of 1918 the author was engaged in the anti-malarial campaign at Vallona. Early in July he himself was exposed to infection there. At the end of the month his blood harboured gametocytes, but he had no ill-effects until the end of August. A sailor who was restored to apparently perfect health after an ague attack which was not treated with quinine, since it induced haemoglobinuria in him, was a carrier of numerous schizonts for months. Gametocytes were found in the blood of 95 per cent of sailors on leave, although

in only half of them was there a history of fever of any kind. The blood of the majority of ague convalescents contained rings, sometimes in large numbers. Carriers therefore, may be discovered among those arriving from Albania and other malarious districts notwithstanding their hale appearance and freedom from ague.

C B

MACDONALD (Angus) **Report on Indigenous Malaria and on Malaria Work Performed in Connection with the Troops in England during the Year 1918** — *War Office Observations on Malaria by Medical Officers of the Army and Others* 1919 Dec pp 178-258 [London H M Stationery Office]

A summary of this report has been published already [see this *Bulletin*, Vol 14, pp 86-87 and Vol 12, pp 324-325]

Comparison of Incidence and Distribution in 1917 and 1918 —

	Cases 1917	Cases 1918
Sheppey	68	31
Isle of Grain	3	3
Sandwich	69	6
Lydd	1	2
Aldershot	4	4
Elsewhere	18	15
Total	163	61

"Elsewhere" in 1918 included 3 cases at Bawdsey (Suffolk), 3 at Dovercourt (Suffolk), 2 at Thetford (Norfolk), and 1 each at Parkeston (Essex), Leicester, Chilwell (Notts), Tetney Lock (Lincs), London Colney (Herts), Purfleet (Essex), and Uckfield (Sussex).

The probable date of infection in 47 out of the 61 cases in 1918 was August. In every instance *A. maculipennis* was present in the huts, and breeding places were in close proximity. Moreover at Sheppey there were 349-552 malaria-carriers in May-August 1918 at Sandwich from 20-57 and at Lydd from 24-91 and 30,000 troops in the vicinity during that period. It is therefore surprising that the epidemic was not more wide-spread. Luckily the bloodsucking habits of British mosquitoes are but little exercised on man. *P. vivax* was the parasite found in every case, and merited the term benign. *A. maculipennis* is found on the ceilings, rafters and among cobwebs of buildings and sheds occupied by stock on which these mosquitoes eagerly feed. Most numerous in September they are found throughout the year. Their larvae have been taken from April to September. The marsh country dykes in which they abound contain almost stagnant water. The grasses, rushes, bladder-weed, myriophyllum and algae provide ample cover for them from the attacks of the sticklebacks and other fish. The salinity of the water in which they thrive may attain 339 parts of chlorine per 100,000. *A. bifurcatus* is a wild mosquito, not yet known to be a transmitter. Adults have been found March-October, and larvae throughout the year. The third British anopheline, *A. plumbeus*, has not been captured in the endemic area. Screening of huts which the carriers occupied, and afterwards removal of carriers from anopheline areas in July and August 1918, winter destruction of imagines, cleaning of dykes were the most important protective measures carried out.

C B

VON NEERGAARD (Dr) *Malariaerfahrungen im Hochgebirge und Beobachtung eigenartiger Pigmentaustossung bei Plasmodium vivax* [Malaria Studies in the Alps and Note on Peculiar Pigment-shedding in *P vivax*]—*Muench Med Woch* 1920 Feb 6 Vol 67 No 6 pp 155-159

From December 1916 to November 1917, at Klosters near Davos in the Swiss Alps at an elevation of about 4,000 feet, and mosquito-free, about 380 malaria patients from the interned Germans and Austrians were treated. From 80 to 90 ague attacks occurred among them each month from December to April. They decreased to 22 in June, 10 in July and 1 in October. Ruge's thick drop method with formalin and acetic acid was first employed in blood examination, but was soon discarded in favour of Ross's. Methylene blue and eosin were preferred to Giemsa's stain. Seventy-three per cent were benign tertian, 24 per cent subtertian, and three per cent quartan. A mononuclear increase was often absent, though lymphocytosis, neutropenia, polychromasia and basophile stippling were frequent. Schueffner's dots were not a constant sign in benign tertian ague. In 5 per cent of the seizures parasites were not discovered, and cases relapsed in which the blood examinations had been negative. Methodical examination of the living blood by means of dark-ground illumination was carried out. Repeatedly the sudden expulsion of pigment granules from the schizonts and gametocytes of *P vivax* was observed. On one occasion a *vivax* microgametocyte was seen to shoot out 4 flagella, and half an hour later to shed particles of pigment. Cell's method of treatment, 0.6 grammes quinine daily, was ineffective. Nocht's 90 day course of quinine, with occasional small doses of salvarsan, gave the best results. Large doses of neosalvarsan recommended by BIEDL were not satisfactory. CORI's so-called abortive cure of 0.6 gm neosalvarsan followed by 2.5 gm quinine on the same day, and 2 gm on the three next days also failed. It was noted that though parasites could seldom be found in blood abstracted 5 to 8 hours after a neosalvarsan injection, yet under dark-ground illumination the plasmodia were seen alive for 20 hours in the blood taken a few minutes after the administration of the neosalvarsan, and did not differ from the control preparation. For after-treatment daily doses of 1.5 to 2 grammes of quinine were used with success.

C B

ECKSTEIN (Fritz) *Malariaforschung in Bayern* [Malaria Investigations in Bavaria]—*Muench Med Woch* 1920 Feb 13 Vol 67 No 7 pp 183-184

Formerly ague was endemic along the valley of the Rhine and at the mouths of the Elbe and Weser. During the War indigenous cases were reported in Strasburg and in several places in Alsace. The anophelines found in Germany are *A maculipennis*, *A bifurcatus*, and *A plumbeus*. The two former are the domestic varieties, though of the two, the latter is more frequently discovered in woods. *A plumbeus* is uncommon, its usual breeding places are holes in beech trees in forests. It was observed that the eggs of *A plumbeus* are laid above the margin of the water, into which they are washed

by the next rain. *Anopheles* frequent the whole valley of the Danube and its tributaries, sometimes in large numbers. Munich is not exempt. Experiments with the applications which are usually recommended as preventatives against mosquito bites showed that they were all ineffective. Oil of citronella was the best but this warded off their attacks for ten minutes only.

C B

CREMONESE (Guido) **Un'incognita nella profilassi della malaria** [An Unknown Factor in Malaria Prophylaxis]—*Malariologia* 1919 June 30 Series 1 Vol 12 No 1-2-3 pp 40-46

The author assumes that the anopholes which appear in April and May are few and do not bite, therefore the benign tertian agues at that time are due to infections in the previous autumn, therefore the *P. falciparum* must change into *P. vivax* with the season. He assumes also that mercury is a prophylactic against ague, therefore all should take it during the winter months.

C B

RODENWALDT (Ernst) **Zur Frage der Chininresistenz der Plasmodien der menschlichen Malaria** [Quinine Resistance of the Plasmodia in Malaria]—*Arch f Schiffs- u Trop-Hyg* 1919 Dec Vol 23 No 23 & 24 pp 555-602

This is a review of recent malarial literature, mostly by German and Austrian writers. References are made to 151 contributions, abstracts of which have already appeared in this *Bulletin* in the majority of instances. No original matter is introduced, except that he states two grammes of quinine a week were sufficient to preserve him and his family from ague attacks for three years. Reduction of the dose to 1.6 grammes a week failed to do so in Togo.

C B

O'CONNELL (Matthew D) **The Diagnosis of Malaria** (Correspondence)—*Lancet* 1920 Feb 28 pp 518-519

Attention is drawn to the fact that carriers may occur among children and others in apparently good health, and also to the difficulty of detecting parasites in some cases of malaria. MANSON in London subjected himself to the bites of mosquitoes infected in Rome. Plasmodia were not discovered during the first three days of the resulting ague.

C B

MANSON-BAHR (Philip) **The Diagnosis of Malaria** [Correspondence]—*Lancet* 1920 Mar 13 p 627

The impossibility of identifying infections and pyrexias at their onset without laboratory investigations is axiomatic, and the necessity of early diagnosis to limit epidemics and to prevent wastage of an army in the field is obvious. In Palestine diagnosis stations were established which assisted in determining the nature of 80 per cent of medical cases. In one, the staff of which was only two officers and

three assistants, 62,000 examinations of blood and dejecta were made, 500 on one day. Without these facilities unavoidable mistakes must occur. In December 1917 half an hour's work at a casualty clearing station showed that 22 of those who had been admitted with a provisional diagnosis of debility, bronchitis, influenza, pleurisy, disordered action of the heart, etc., were suffering from subtertian ague. If malaria had not been recognised they would have been evacuated and quinine treatment delayed for 2 or 3 days. After the occupation of Damascus a microscopical examination of the blood of 11 out of 15 "dysenteries," 30 out of 40 "influenzas" were subtertian infections. Three cases were sent down as insane, two of which proved to be fatal subtertian agues. The *P. falciparum* caused 800 deaths in 1918, but the *P. vivax* rarely kills. The total number of blood examinations by the field laboratories in a period of less than six months was 111,261, or one third of the fighting force. In the eight front line laboratories and diagnosis stations 14,842 benign and 9,906 subtertian infections were determined. Many of the benign cases were not sent to the base. Thus nearly a Division of Allenby's force was kept and spared for the great advance in September 1918, during which 1,800 fresh subtertian infections occurred.

C B

DAZZI (Angelo) **Le iniezioni di adrenalina per la diagnosi di malaria latente** [Injections of Adrenalin in the Diagnosis of Latent Malaria]—*Polidimico Sez Prat* 1919 Nov 30 Vol 26 No 48 pp 1413-1417

The author states that having tried various "provocative" agents with a view to driving malarial parasites into the blood and so establishing a diagnosis in cases of latent malaria, he has found hypodermic injections of adrenalin (dose 1 milligramme) by far the most certain and satisfactory. He states his conclusions as follows—

1 The administration of 1 milligramme of adrenalin, harmless for the patient, does not bring on a typical malarial attack but is uniformly followed by the discovery of plasmodia in the blood stream.

2 The presence of parasites in the blood is transitory. Commencing about 20 minutes after the injection, it reaches its height in an hour and after 24 hours parasites are no longer to be found. In cases in which parasites are already present their number is notably augmented.

3 Adrenalin causes marked diminution in size in the malarial spleen save in cases of advanced splenic sclerosis. The diminution is noticeable a few minutes after the injection and is accompanied by the disappearance of tenderness on deep palpation and of pain associated with the movements of respiration, to the great relief of the patient.

F S A

WEINBERG (M) **Malaria und Grippe**—*Beihfte z Arch f Schiffs- u Trop-Hyg* 1920 Jan Vol 23 No 4 pp 176-185

The rapidity of the spread of the influenza epidemic of 1918 and the high rates of incidence and mortality were remarkable. From October to December 1918, 500 cases of influenza were admitted to the Haidar Pascha Hospital from the German troops, 80 per cent

of whom were malaria carriers at that time. In 125 of the influenza cases malarial parasites were found. The death rate in these was 12 per cent, that of the remainder was 7 per cent. In the fatal influenza attacks no differences were noted in the post mortem appearances in the malarial and non-malarial. The author thinks that the virulence of the influenza germ is the chief factor in determining the mortality and that the complication of malaria does not exercise a great influence in this respect.

C B

WEINBERG (M) **Magenfunktion und Anaemie bei chronischer Malaria**—*Beihfte z Arch f Schiffs u Trop-Hyg* 1920 Jan Vol 23 No 4 pp 163-175

In 15 cases of chronic malaria with dyspeptic symptoms the stomach contents were examined after a test meal. The free hydrochloric acid was estimated by the congo-red and dimethylamidoazo benzol methods. In 7 in which the red blood count was only 3 million or less, hydrochloric acid was absent or present in mere traces. In the rest the free hydrochloric acid approached the normal amount. As the anaemia became less the hydrochloric acid titre became greater.

C B

CHAUFFARD **Sur un cas de Cirrhose paludéenne**—*Jl des Praticiens* 1920 Jan Vol 34 No 1 pp 3-4

The author's observations lead him to believe that as the size of the spleen diminishes in malaria that of the liver increases. He refers to KELSCH and KIENER's investigation on malarial nodular hepatitis. Two cases of his of ascites after ague, one of which was complicated with lead colic, were benefited by quinine.

C B

GUTMANN (R. A.) & PORAK (R) **Les Foies hypothermiques du Paludisme**—*Presse Méd* 1920 Feb 4 Vol 28 No 0 pp 95-96 With 5 text figs

The authors have examined a large number of the notes and temperature charts of cases of ague contracted in Greece, Macedonia, Italy and North Africa, and have noted that in a certain number the temperature oscillates about 97° F for weeks. Also after a typical ague attack the temperature may run a subnormal course from 97°-98° F, in which a three or seven, more rarely a ten or four-day rhythm is apparent, the temperature ascending to 98.6° F, to fall again next morning. In some charts the sharp ascent of the subnormal temperature to 98.6° has the same periods as the fever during the pyrexial attacks. Also sudden drops in the subnormal curve to 95° F occurring every 7 or 4 days are sometimes observed. Occasionally the subnormal temperature has an undulant course, there being a considerable difference between the morning and evening records. The authors

think that a gradual rise in the subnormal wave foretells an ague attack. They suggest that the temperature of malarial cases should be observed thrice daily since the maximum is usually reached at noon

C B

FALCONER (A W) **The Pulmonary Manifestations in Malaria—**
Jl Roy Army Med Corps 1920 Feb Vol 34 No 2
 pp 131-140 With 1 text fig & 4 charts

In four cases, during ague seizures, there was a sudden appearance of gross physical signs indicating collapse of the lung. The sputum was dull white, uniform, unaerated, sometimes blood-stained but unlike that of pneumonia. One of these ended fatally. He had had much dyspnoea, cyanosis and prostration. Thirty grains of quinine were given intravenously followed next day by two intramuscular injections of thirty grains each, within three hours of the last of which he died. There was great congestion of the capillaries of the alveolar walls, giving rise to apparent consolidation, but no inflammatory solidification. A post mortem examination was also made in the case of a man who succumbed to a lesion in his pons during an ague attack. Although there had been no pulmonary symptoms there was great turgescence of the alveolar capillaries of the lower lobe of the right lung, which was collapsed. Three other cases are described in which the physical signs, sputum and polynuclear leucocytosis pointed to a pneumococcal infection occurring in malaria.

C B

MANSON (Wm Hislop) **Personal Experiences of the Ocular Sequelae of Malaria—***Glasgow Med Jl* 1920 Mar New Series Vol 11 pp 127-129

The author, who is Surgeon to the Glasgow Eye Infirmary, has gained his experience from 12,000 malarial cases. Every attack of ague is followed by a temporary slight icteric hue of the conjunctiva, often visible only after the lower lid has been drawn down. Ulceration of the cornea, though uncommon, is the most frequent sequela. It occurs generally after 20-50 relapses of benign tertian fever. Beginning with hyperaemia and lacrymation, usually a small streak of ulceration is noticed but it may be dendritic and is situated in the centre of the cornea. It is easily observed on applying a 2 per cent solution of fluorescein to the eye. It is very painful and heals very slowly, and is liable to recurrence with each relapse. Iritis often complicates it, but is not seen apart from corneal ulcer. The best treatment is douching with physiological saline fluid and atropine drops. The application of absolute alcohol is very painful and of no value. Herpes zoster ophthalmica accompanied the ulceration in one instance.

Subhyaloid intraocular haemorrhage, a very rare sequela, was noted in two subtertian cases, in one it was double. On one occasion paresis of the external rectus, on another paralysis of the accommodation was noted. Both the patients recovered. Total ophthalmoplegia of the left eye which came on 10 days after an ague seizure

in one case, was permanent. The routine treatment was to give 60 grains of quinine by the mouth daily for a week, but no instances of toxic amblyopia or optic atrophy occurred though he states there were two cases of quinine amaurosis, one recovered but the other remained blind. It was probable that each had taken 80 grains of quinine in one dose [see this *Bulletin*, Vol 14, p 79]

C B

DALRYMPLE (J) **Report on the Treatment of Malaria-Infected Troops in France—***War Office Observations on Malaria by Medical Officers of the Army and Others* 1919 Dec pp 132-148 [London H M Stationery Office]

During June and July 1918 twenty-two battalions averaging about 800 each, arrived in France from Salonika, of whom it was estimated that 75-85 per cent were malaria carriers. Camps were formed near Dieppe and Aumale at which 15 grains of quinine sulphate or hydrochloride were given to every officer and man for 14 successive days, then ten grains a day for six days a week for two months. During the first fortnight no man was called upon to do more than four hours duty a day. Physical training was then cautiously extended, till finally the troops were put to the test of a 14-mile route march with field operations and of bivouacing at night in the open. The average duration of treatment was ten weeks. The result was that relapses which numbered from 50 to 500 in the various battalions during the first week fell to almost zero in the last week, and the men had regained their robust appearance and were able to take their place at the front. Relapses were treated with 40 grains of hydrochloride or sulphate of quinine in solution a day in four doses, for 5 days. After being fever free for two days the man was sent back to his unit to begin again with the after treatment.

C B

Row (R W Harold) **Observations on the Pathology and Treatment of Malaria—***War Office Observations on Malaria by Medical Officers of the Army and Others* 1919 Dec pp 259-298 [London H M Stationery Office]

From the end of February 1917 until January 31st 1919, 3,343 cases of malaria were studied in the Malaria Section of the 4th London General Hospital. The results are based on the examination of nearly one cubic millimetre of blood in a thick film.

***P. vivax* Infections**—Under thirty grains of quinine hydrochloride in three doses by the mouth, a day, in 68 out of 109 benign tertian agues asexual parasites were no longer found. The average time of their disappearance in the total 109 was 4.3 days. The average number of days for the blood to become negative in 92 similar cases treated with like doses of the sulphate was 4.1 days, in 17 treated with the hydrobromide 5.9 days. Intramuscular injections of 15 or 22 grains of quinine bihydrochloride daily caused the disappearance of *P. vivax* schizonts in 4.3 days, on the average in 19 patients.

Effect of frequency and amount of dose on P vivax schizonts

	Number of Cases	Average number of days for blood to be negative
Single dose daily		
Fifteen grains by injection	5	3 8
Twenty grains by mouth	16	3 0
Twenty grains by injection	13	4 6
Three doses daily		
of five grains oral	8	4 1
of ten grains oral	193	4 2
of fifteen grains oral	3	4 0
of twenty grains oral	15	4 5
for two days		
Four doses daily		
Three of 10 grs by mouth and one of 15 or 30 grs intra muscularly	4	6 0
Nine doses daily		
of 10 grains for 3 days	6	5 1
Twelve doses daily		
of 2 grs for 60 hours	21	4 0
of 5 grs for 48 hours	16	4 75

A single oral dose of 30 grs in 5 cases and a single injection in 3 caused the blood to become negative almost as soon as occurs after more prolonged treatment. Intramuscular injections of 10 grs of the bihydrochloride every second or third day failed to cut short the fever. In the prevention of relapses in 24 cases treated with a few large oral doses, and in 23 treated with 1 to 4 injections, the percentage of relapses was 74. The rate was lowered to 62.5 per cent of 93 cases subjected to intermittent oral treatment of 60 to 120 grs quinine distributed in from one to four days, and repeated after intervals of 4 or 5 days. The ratio of relapses was still further reduced to 36.6 per cent of 204 cases which received orally 30 grs quinine in three doses a day for 1 to 15 days. Continuous daily injections up to eight days gave relapses in 57 per cent of 21 cases. When the oral treatment was continued for 16 to 30 days 31 per cent of 668 cases relapsed. When the course was extended beyond 30 days 35 per cent of 46 so suffered. Sulphate of quinine gave the best results, 24 per cent of 258 cases treated with this salt relapsed, 32.6 per cent of 690 treated with the hydrochloride, and 46.4 per cent of 28 treated with the hydrobromide relapsed. Relapses were noted in 6 out of 8 patients to whom were given 30 grs of quinine for 6 days and an injection of novarsenobillon on the 7th, this course being repeated twice. Of 58 to whom 20 grs of quinine were given four hours before the time of the expected attack for 21 days only 31 per cent relapsed.

Euquinine was administered by the mouth to seven patients in three 10 gr doses a day for 4 to 24 days. It was as effective in removing the parasites of benign tertian ague from the blood as quinine. Colloidal quinine was without effect on *P. vivax* when given in doses of 3 grs daily by the mouth (one case) or intravenously (one case). Sodium quinine sulphonate likewise failed in four cases in

doses of 30 grs a day for 4 to 10 days Ethyl quinetine hydrochloride removed *P vivax* schizonts from the blood of 8 cases in 6-9 days on an average Mistura Anarcotine Co, which contains quinine hydrochlor gr v to the ounce, was less useful than a solution of quinine alone of the same strength Quinine "Absorbent," which contains about 6 per cent of the alkaloid, was employed in three cases for 7 to 14 days in doses of 126-252 grains a day, the parasites persisted in one for seven days but disappeared from the others in four and five days The mixed alkaloids of Nectrandra were without effect on three patients in doses of 15 to 30 grains a day for seven days A daily injection of half a gram of emetin exercised no influence on the course of a benign tertian ague Quinoidin in 26 cases proved incapable of eradicating the parasites or of preventing relapses Two grains of sodium cacodylate injected every other day in three cases were without benefit Di-sodo-luargol injections, increasing to a maximum of a quarter of a gramme, were ineffective in 7 cases Kharsivan caused the parasites to disappear in 60 hours when injected into two patients, but a relapse occurred in one on the 29th day after the seventh weekly injection Trypsin and amylopsin were useless in two cases Splenox did not benefit three patients to whom it was given daily for 5 to 20 days Eusol introduced into the veins of one case to the amount of 50 cc was unable to remove *P vivax* from the blood Sodium fluoride was unsuccessful in the only case in which it was tried

In *P falciparum* infections the presence of the asexual forms is more erratic than in benign tertian ague They may disappear in one day, but they often persist 7 or 8 days In one case they were discovered after 30 grains of quinine daily for 13 days On the other hand in the *P vivax* infection the patient is liable to relapses for a long period, but in *P falciparum* cases the liability of relapse is much less This is noticeable in double infections Out of a total of 45 such instances, 11 had attacks of benign tertian ague after the disappearance of the malignant parasites The reverse was not observed on any occasion Euquinine was tried in 10 malignant tertian cases for about a week followed by quinine, two relapsed Three injections of 1 gr each of orsudan were given to six *falciparum* cases before their course of oral quinine, relapses occurred in all A weekly injection of novarsenobillon in the course of daily quinine treatment was given to three patients, the average time of disappearance of the crescents was 28 days, but two of them relapsed Three injections of tartar emetic on alternate days were used in four cases In one the crescents disappeared in 9 days, in the others they persisted until after quinine treatment was begun The asexual forms remained unaffected by the antimony Two suffered from relapses Di-sodo-luargol injections in one case failed to remove the crescents or to prevent a relapse Eusol, 50 cc of which were injected into one malignant tertian case, had no effect on the parasites or the fever The standard treatment adopted in the 4th London General Hospital is 30 grains of quinine sulphate or hydrochloride divided into three doses and continued for 10 or more days In 42 cases under these doses crescents disappeared in 30 days The standard anti-relapse treatment has been—10 grains of quinine

daily, or 10 grains thrice daily on two days each week. Each method has been equally successful, when continued for two months.

Seven cases of blackwater fever occurred in three malignant tertian, one benign tertian, two double infections, and in one with a history of having had *P. falciparum* in his blood. Only three of these were suffering from ague when attacked. Although all received considerable doses of quinine after the seizure, yet they had no recurrence of the haemoglobinuria.

C B

V D HELLEN **Die Behandlung der Malaria im Ortslazarett Haidar Pascha** [Treatment of Malaria in the Local Hospital at Haidar Pascha]—*Beihfte z Arch f Schiffs- u Trop-Hyg* 1920 Jan Vol 23 No 4 pp 149-153.

During the retreat of the German troops from Turkey during the summer and autumn of 1918, all attempts at quinine prophylaxis were given up. Malaria became widely prevalent, thus no less than 42 per cent of 288 medical cases admitted to a hospital at Aleppo from 5th to 13th October were ague. The malaria admissions to the Haidar Pascha hospital amounted to 335, 113 of which were benign tertian, 212 subtertian, 9 double infections and 1 quartan. One hundred and sixty six were treated according to Nocht's method with 1.2 grammes quinine a day, but to 21 of the benign cases salvarsan was also given. During the after treatment 32 relapses occurred, one being among the salvarsan cases. To another series of 84, quinine in larger doses, on the average 1.8 gm a day, was given. Salvarsan also was administered to 5 of the *P. vivax* infections. Seventeen relapsed during the after treatment. In the remaining 69 the doses of quinine were gradually increased from 1.2 to 1.8 gm a day. Six of these relapsed during the after-treatment. The author admits that no conclusion can be drawn from his observations, as the subsequent progress of the patients could not be ascertained.

Intramuscular injections were seldom used, as the pain lasted a week. Quinine in daily doses of 1.2 to 1.8 a day apparently had no effect on 45 crescent carriers. Neosalvarsan was useless in the subtertian cases. The three deaths which occurred were all caused by *P. falciparum*. Another subtertian case ended fatally from blackwater fever. It was noted that the quinine excretion in this patient was prolonged for four days. Two other subtertian carriers also suffered from haemoglobinuria. They recovered under quinine 0.1 gm, increasing by this amount daily as soon as the urine was free from albumen.

C B

MALIWA (Edmund) **Bemerkungen zum Malaria-therapie-Merkblatt des Malaria-Zentralspitals in Wien**—[Remarks on the Memorandum concerning the Treatment of Malaria issued by the Vienna Malaria Central Hospital]—*Wien Klin Woch* 1920 Jan 15 Vol 33 No 3 pp 65-66.

The author deprecates too prolonged after-treatment with quinine. In many cases he has found that the blood harboured gametocytes for long periods notwithstanding large doses of quinine. He favours

provocative treatment by means of injections of milk, proteïn or nucleate of sodium, but admits that it fails at times. Injections of arsenical preparations are necessary in protracted cases with an irregular, often subnormal range of temperature. A mononuclear increase is no guide to treatment for he has seen it persist long after all clinical manifestations have disappeared.

C B

ZWEIG (W) & MATKO (J) **Die Diagnose und Therapie der Malaria.**
—*Wien Klin Woch* 1916 Nov 30 Vol 29 No 48 pp
1516-1522 [Received March 1920]

In a study of a hundred cases of malaria, polychromatophilia was observed in 4 out of 14 malignant, and in 5 out of 70 benign tertian infections. Red corpuscles which contained basophile granules occurred in 6 of 11 malignant, and in 28 per cent of 43 benign tertian cases. Their number appeared to be uninfluenced by quinine in benign tertian ague, but to increase after intensive quinine treatment in the malignant infection. The blood platelets varied greatly. There was generally a considerable decrease during the ague fit. So rife was malaria in the Austrian Southern Army that an Army order was published at the end of March 1916, directing that 0.2-0.3 gm quinine should be issued to the troops daily. This, however, was not carried into effect until the July, meanwhile paludism was very prevalent among the forces which had occupied the malarious Albania in May. Hence quinine prophylaxis gave inappreciable results. Nocht's treatment is advocated, i.e., 5 two-hourly doses from 6 a.m. to 2 p.m. of 0.2 gm. of the bisulphate of quinine in powder for ten days—three days interval, repetition of the 5 doses for two days—four days interval—two days quinine in the same doses—five days interval, two days quinine—8 days interval, treatment continued for two months. Intravenous injections of a one in five solution of quinine were used, doses of 0.8 gm. were harmless. Larger doses, which must be injected very slowly, sometimes caused vertigo, deafness, spasms, and in one case convulsions, dilated pupils, Cheyne-Stokes breathing which continued for 18 hours. In a few instances only, did the parasites disappear. Often after 4-7 intravenous injections, crescents and rings were still to be found, even if the dose was raised to 1.4 gm. Three relapses were noted in 8 cases of benign tertian ague treated intravenously. No advantage was observed by provocative measures, such as faradization of the spleen, or injections of tuberculin or milk. Sodium cacodylate benefited post malarial anaemia.

C B

PHEAR (Arthur G) **The Treatment of Malaria in Macedonia.**—*Lancet* 1920 Jan 24 pp 195-196

The treatment advocated is based on three seasons' experience in Macedonia. Forty-five grains of quinine sulphate were given daily by the mouth in three doses for three or more days, then thirty grains daily for a week or a fortnight, and afterwards thirty grains on two successive days a week indefinitely. In more severe or persistent cases, four 15 grain doses were given by the mouth. If vomiting

occurred two intramuscular injections of 20 grains of quinine bihydrochloride were administered, and 20 grains orally. In cerebral malaria 10 grains of the bihydrochloride in 20 cc of saline fluid were injected into the veins—convulsions and hyperpyrexia sometimes followed the intravenous injection of larger amounts—one or more intramuscular injections were then given. In a few cases no less than 100–120 grains of quinine in the 24 hours were required. Quinine amblyopia was observed in a few instances but, with rare exceptions, it was transient. Only a few and trivial ill-effects were seen as the result of the enormous number of intramuscular injections. If, however, the patient had become much enfeebled by chronic dysentery for instance, great destruction of muscular tissue ensued. Sometimes 5–10 grains of quinine in 5–10 ounces of saline fluid were given per rectum, and a small series of hypodermic injections was carried out. The risk of local complications was greater with the subcutaneous than with the intramuscular method. Galyl was disappointing, except in severe anaemia and convalescence from blackwater fever. The benign tertian fevers were often very severe, and the subtertian mild. Only 22 per cent of those subjected to the after treatment had relapses against 68 per cent in the controls.

C B

TAYLOR (J A) *The Routine Treatment of Malaria in Uganda — Brit Med J* 1920 Jan 24 pp 113–114

During ten years' experience in Uganda the author has treated thousands of cases of malaria, mostly subtertian. No pure quartan agues have come under his observation. Benign tertian was rare but has become more common since the outbreak of the War, he thinks that this has been caused by troops bringing the infection from India. His method of treatment has been—Five grains of calomel at night and a saline purge in the morning, followed one hour after the salts by five grains of quinine hydrochloride, repeated thrice at intervals of two hours, twenty grains daily in five grain doses afterwards. During the apyrexia fifteen grains a day for a week, ten grains daily for a fortnight, and five grains a day for two months before meals, supplemented with iron and arsenic have resulted in no relapses or complications. Five to fifteen grains of phenacetin for headache, and aspirin for muscular pains were employed. If the quinine was vomited, or if the temperature rose above 104° F before 15 grains of quinine had been given, he made use of intramuscular injections of quinine. In less than one per cent of his cases was this necessary, and more than one injection was seldom required. The temperature fell to normal limits on the third day usually, but if it was the first attack on the fourth or fifth day. Larger doses of quinine did not give such favorable results. He regards blackwater fever as caused by the neglect of the calomel purge. He has had no cases among his patients treated in the manner described, the only two deaths from this complication in his practice occurred in those to whom calomel had not been given. He believes that five grains of calomel at the onset will cut short an attack of blackwater fever.

C. B.

- i MURRAY (W A), ii LAW (W F), iii COLLETT (J Wallace),
iv DRAKE-BROCKMAN (R E) *Treatment of Malaria* [Correspondence]—*Brit Med J* 1920 Feb 14, 21, & Mar 13
pp 235, 272-273, & 381

i The writer states that he himself has taken 10 grains of quinine daily for four months with a satisfactory result. From his experience in the Malarial wards of the 4th London General Hospital he concludes that the use of aspirin is unnecessary, and he suggests that aspirin may be the cause of some of the instances of disordered action of the heart which follow ague. He found that galy and arsenical compounds were not of value as quinine substitutes.

ii The writer has had long experience in British Guiana and other tropical places. His treatment of malaria is almost exactly identical with TAYLOR'S [see above]. He attaches great importance to the preliminary dose of from three to five grains of calomel which is followed in four hours by sodium sulphate. Quinine is then given in five grain doses every three or four hours until the temperature has remained normal for forty eight hours. Five grains thrice daily for the next ten days and five grains twice daily for another like period, and a single dose of five grains every morning for three or four months. He prefers quinine hydrochloride to the sulphate, and used it solely during his last ten years in British Guiana. Thirty grains should be the maximum amount administered in the twenty four hours. During convalescence he gives arsenical but not iron preparations. Intramuscular injections have been necessary in less than one per cent of his cases. One or two doses of ten to fifteen grains of the hydrochloride have been thus given without bad effects. The malaria has been mostly subtertian with few benign tertian infections. Quartan has been almost unknown.

iii The writer's twenty five years experience in British Central America, and the West Coast of Africa leads him to believe that oral treatment with quinine is sufficient in the large majority of cases of ague. Beginning with calomel he uses phenacetin or aspirin if indicated, then quinine hydrochloride or hydrobromide in three to five grain doses at frequent intervals. He is averse to the employment of large doses and states that much caution must be exercised when doses of fifteen grains repeated twice or thrice are ordered. He continues quinine treatment for a fortnight to three months after convalescence. He has seen some remarkable recoveries of cerebral and malignant malaria after intravenous injections of quinine. Quinine intra-muscularly has been required in "bilious remittent" cases. Beyond local tenderness untoward symptoms have been rare. He is of the opinion that the prophylactic administration of five grains of quinine daily makes a remarkable difference in the ague incidence. No comparative rates are mentioned.

iv From the writer's experience in Tropical Africa from 1900 until recently and from his observations on several hundred ex-soldiers who have suffered from ague he has come to the same conclusions as TAYLOR, LAW, and COLLETT [see above]. He has seldom given quinine in any way except by the mouth. The improvement in the troops under ten grains of quinine in solution before breakfast for a

month has been remarkable. The course is continued for another two months. If relapses had occurred the dose was increased to 15 gr for a time. In only one case enlargement of the spleen persisted.

C B

CARTER (H. R.) *Treatment of Malaria—Public Health Reps*
Washington 1919 Dec 26 Vol 34 No 52 pp 2959-2960

This is the report of the Sub-committee on Medical Research of the National Malaria Committee dated November 1919, and signed by C. C. BASS, (Chairman), and W. KRAUSS, W. H. DEADERICK, G. DOCK, and C. F. CRAIG. The standard method of treatment recommended for general use is:

"For the acute attack 10 grains of quinine sulphate by mouth three times a day for a period of at least three or four days, to be followed by 10 grains every night before retiring, for a period of eight weeks. For infected persons not having acute symptoms at the time only the eight weeks' treatment is required. The proportionate doses for children are: under 1 year, one half grain; 1 year, 1 grain; 2 years, 2 grains; 3 and 4 years, 3 grains; 5, 6 and 7 years, 4 grains; 8, 9 and 10 years, 6 grains; 11, 12, 13 and 14 years, 8 grains; 15 years or older, 10 grains."

C B

GARDNER (T.) *Some Observations on the Malaria Parasites under the Influence of Various Doses of Quinine Administered Orally. Enumerative Methods Employed (32 Cases of *P. vivax*, 3 Cases of *P. falciparum*)—War Office Observations on Malaria by Medical Officers of the Army and Others* 1919 Dec pp 299-318 [London: H. M. Stationery Office.]

In 8 benign tertian agues the effect of 30 grains of quinine hydrochloride daily in three doses was to reduce the number of parasites which ranged from 1,000 to 29,000 per cmm, with one exception, to zero in an average of 63½ hours. Twenty grains a day in two doses in two cases caused 5,000 to 7,000 parasites to disappear in 71 hours. Fifteen grains daily divided into three doses in three cases carrying 8,000 parasites per cmm rendered the blood negative in an average of 63 hours. Two five-grain doses a day destroyed 2,464 parasites in 72 hours (one case). In five patients three 3-gr doses daily cleared the blood in 63 hours, the plasmodia ranging from 1,000 to 17,000 in them respectively. Four 2-grain doses a day were effective in an average of 56½ hours in eight cases, in which the blood contained from 480 to 23,000 parasites per cmm. A mixture containing liquor arsenicalis m v and liq hydrarg perchlor m xx thrice daily for seven days left the census of parasites unchanged. They disappeared 54 hours after this patient had taken 15 grains of quinine a day. Under the same preliminary treatment in another case the parasites increased from 32 to 1,888 per cmm. Sixty-five hours after the commencement of 8 grains of quinine daily they had disappeared. In a third case the preliminary treatment with arsenic and mercury was carried out for 4 days during which the plasmodia increased from 800 to 11,000 cmm. The blood became free 84 hours after the administration of 8 grains of quinine daily. A fourth case was a light infection, under the arsenic and mercury mixture for four days the parasite

counts varied from 176 on the first day to 64 on the fourth. They were no longer found 14 hours after 8 grains of quinine had been given. In the fifth case the arsenic and mercury mixture was continued for 7 days, the parasites decreased from 208 to 8 per c mm but they increased to 1,000 per c mm on the 16th day. For the 9 days previously the patient had been taking 5 grains of quinine daily, as soon as this was increased to 8 grains a day their numbers declined and they could no longer be found after 72 hours.

In a malignant tertian case the asexual forms were not detected 78 hours after the administration of four 2-grain doses of quinine a day. Crescents were first seen 72 hours after the beginning of the treatment. On the sixth day three 10 grain doses were given and continued daily. Twenty five days later the crescents had disappeared. In a *P. falciparum* and *vivax* infection, under four 2-grain doses a day the *P. vivax* disappeared in 72 hours, but the schizonts of *P. falciparum* persisted for 120 hours. Crescents were visible in 96 hours and persisted till the twenty seventh day. On the sixth day the quinine had been increased to 30 grains a day. In a malignant ague in which both gametocytes and schizonts were present at the onset, 30 grains of quinine a day caused the disappearance of the asexual forms in 96 hours and of the crescents in 28 days.

C B

Ross (Ronald) **Mode of Quinine Administration** [Correspondence]
—*Brit Med J* 1920 Jan 24 pp 130-131

Referring to WILLCOX's clinical estimate of the comparative values of quinine administered by rectum, mouth, intramuscularly and intravenously respectively, as 1 2 20 40, the author notes that when a change is made, the benefits of previous treatment may not be obvious for some days. According to the best Italian work from the time of TORTI quinine given shortly before an impending attack, or even given repeatedly during that paroxysm, may not modify it, but will annul the next. The reason of this is that, according to ANTOLISEI, GOLGI, MARCHIAFAVA and BIGNAMI, quinine is unable to destroy the segmenting forms of the parasite, to the breaking up of which the ague fit is due. Ross's own observations support this view. In the Report of the numerous War Office researches recently published very little difference was observed in the effects of the oral and intramuscular administration. S P JAMES indeed, ascertained that intravenous injections secured more rapid results in ten carefully selected cases, but relapses remained as frequent as with other methods [see this *Bulletin*, Vol 11, p 21]. Moreover recent chemical work shows that there is little variation in the excretion of quinine, no matter how it is given. The experiments of RAMSDEN, LIPKIN and WHITLEY [this *Bulletin*, Vol 13, p 92] indicate that there is great destruction of quinine in the tissues, especially after large doses, and that the concentration of the quinine in the blood is not much greater with large doses than with small. Ninety per cent of the quinine injected intravenously vanishes in a minute. The concentration of quinine in the urine is higher than in the blood except in black-water fever. DUDGEON pointed out that intramuscular injections of quinine cause much local necrosis of the tissues. Ross sees patients

every day in whom no permanent cure has been effected by injections, either intravenous or intramuscular. In the thousands of ordinary attacks seen during the last three years oral treatment has been sufficient, but in grave seizures injections may be necessary

C B

WILCOX (W H) Mode of Quinine Administration [Correspondence]—*Brit Med J* 1920 Jan 31 pp 168-169

From the author's experience in Mesopotamia and Northern Persia he concludes that injections of quinine are not desirable in ordinary ague, but that they are called for in severe and intractable infections which have resisted oral treatment. In not a few cases quinine had been given by the mouth for ten days without benefit. He believes that many lives were saved by injections, and this opinion was shared by those who were in charge of the cases. Too much importance should not be attached to the fact that the circulating blood retains but little of the quinine, for the liver and spleen rapidly absorb alkaloids and organic substances, such as morphine, strychnine, salvarsan, etc.

C B

WILTSHIRE (Harold) Local Effects of Quinine Injections [Correspondence]—*Lancet* 1920 Feb 7 p 352

In reference to DUDGEON's article summarised in this *Bulletin*, [Vol 15, p 119], the writer agrees with his statement of the destructive effects of intramuscular quinine injections, but not with his deductions therefrom. From Wiltshire's experience in Salonica [and many would agree with him from long experience in the tropics] the patient is none the worse for the patches of necrosis.

"The consensus of clinical opinion in the Salonica Forces was certainly in favour of the free use of intramuscular injection as a means of obtaining a rapid control of the severe infections which were so common. I believe that for every case of permanent disability from muscle or nerve injury produced by these injections several lives were saved, and in consequence I think that any statement which would tend to restrict the use of this method of treatment in the severer forms of malaria is to be regretted."

A G B

Roux (F) Treatment of Malaria, and Chiefly of Chronic Malaria and Blackwater Fever.—*Trans Soc Trop Med & Hyg* 1920 Jan 16 Vol. 13 No 5 pp 91-92

During three years in Madagascar, Reunion, Algeria, Haiti, Brazil, and French West Africa thousands of malaria cases have been treated with intravenous injections of 2.5-5 milligrams of colloidal quinine (*collobrase de quinine*) in 2-4 cc of water. The smaller dose has been sufficient for the milder cases. Three injections only have been necessary in the majority. The reaction which follows, sometimes almost immediately, may be very severe. Headache, vomiting, rigors, lumbago and rise of temperature are the usual symptoms. The treatment is most effective in those suffering from chronic malaria. Only in three per cent of the patients has failure resulted.

C. B

VEALE (P J) **Treatment of Three Cases of Malignant Tertian Malaria with Special Treatment**—*Jl Trop Med & Hyg* 1920 Mar 1 Vol 23 No 5 pp 59-63

Sixty to 100 cc of a 5 per cent solution of disodium hydrogen phosphate and 5 per cent sodium chloride were injected intravenously, in addition to quinine in large doses administered by the mouth and into the muscles and veins. In one case the blood was negative 6 days after the saline injection. In the second parasites persisted for a fortnight but were not found two days later. In the third case the blood was positive six days after the saline treatment. There is no record of later blood examinations in any of the three cases.

C B

OLLENBACH (D S) (1) **Cinchonidine in Malaria**—*Ind Med Gaz* 1920 Jan Vol 55 No 1 pp 14-15

— (11) **Second Series of 25 Cases of Malaria treated by Hypodermic Injections of Cinchonine Bihydrochloride**—*Ibid* 1920 Feb. No 2 p 57

1 Two to four injections of cinchonine bihydrochloride into the deltoids of each of 24 cases of malaria were made on successive days. The first dose was 7 minims containing 3 grains, the later were 10 minims containing 5 grains. Two relapses within two months are noted, but there is no record of the length of time the others were under observation. Painful arms sometimes followed repeated injections.

11 Five to eighteen and a half grains of the alkaloid were given hypodermically in from one to four injections to 25 patients. No local or constitutional symptoms were noted. Two were lost sight of. The others are in good health, some of whom have been six months under observation.

C B

REITLER (Rudolf) **Ueber kombinierte Chinin-Methylenblautherapie der Malaria**—*Wien Klin Woch* 1920 Jan 1 Vol 33 No 1 pp 9-12

Five doses daily of 0.1 gm of methylene blue are usually well borne, but occasionally they give rise to gastric disturbances. Such treatment alone if pursued for three or four days was without effect, but if quinine had been administered previously or was combined with it, benefit thereby was noted. Nine prolonged cases of ague refractory to quinine are cited in which courses of methylene blue preceded by quinine reduced the number and severity of the seizures. In two of these however, parasites persisted in the blood. One case is noteworthy, which occurred in a man who was suffering from a very protracted subtertian infection resistant to quinine. He surreptitiously swallowed 9 grammes of quinine with the immediate consequence of an attack of haemoglobinuria. Relapses of ague took place six weeks later and continued for five months. Courses of methylene blue preceded by 0.2 gm of quinine were then begun. The seizures became fewer and milder afterwards. The effects of combining 0.1-0.5 gm quinine with 0.5 gm methylene blue daily were observed.

in 44 benign tertian cases. The treatment appeared to be successful in cutting short the paroxysms and in freeing the blood from parasites but relapses were observed in 32. The author concludes that methylene blue has the property of enhancing the action of quinine in ague.

C B

GREIG (E D W) **Observations on the Effect of Intravenous Injections of Antimonium Tartaratum on Malarial Parasites**—*Ind J Med Res* 1917 July Vol 5 No 1 pp 231-238 With 1 chart [Received February 1920]

This precise experiment is a model of the manner in which therapeutic research should be carried out. The blood of a man who complained of bronchitis only was found to contain more than 8,000 crescents per cmm besides benign tertian rings. His spleen was only slightly enlarged. His case is interesting inasmuch as he stated that he felt quite well, with the exception of the cough, notwithstanding the heavy infection of his blood. Ten cc of a one per cent solution of tartarated antimony were given him intravenously on seven successive days. In all 0.7 gram of tartar emetic was injected. The crescents meanwhile varied from 5,000 on the day of the first injection to 13,000 per cmm on the day of the fifth dose. His temperature rose to 101.5° on that evening. Benign tertian gametocytes were found next day in company with nearly 7,000 crescents, and also two days later when the last injection was administered. Quinine treatment by the mouth was then begun which caused the rings of *P. vivax* to disappear in two days and reduced the crescents to 85 per cmm. The only favourable effect of the antimony was that the bronchitis cleared up. It entirely failed to destroy the crescents and rings of subtertian and the gametocytes and rings of benign tertian ague. Low and NEWHAM's (this *Bulletin*, Vol 9, p 455), FALCONER and ANDERSON's (Vol 11, p. 301), LEVY and WALL's (Vol 12, p. 57) observations are thus confirmed.

C B

PLASCHKE (Siegfried) & BEKOVIĆ (Max) **Urotropin als Malariaheilmittel**—*Wien Klin Woch* 1916 Nov 23 Vol 29 No 47 pp 1495-1496 [Received March 1920]

Seven to eight grammes of urotropin daily in half gramme hourly doses were given to ten ague cases in water acidulated with citric or hydrochloric acid. Its action is not so prompt as that of quinine, but it is useful in those cases which resist quinine. It does not cause a sudden fall in the temperature, but the asexual parasites gradually disappear from the blood. Gametocytes persist longer.

C B

FORBES (J Graham) & LUNN (R F) **Galyi in the Treatment of Post-Malarial Anaemia**—*Lancet* 1920 Feb 28 pp 493-494

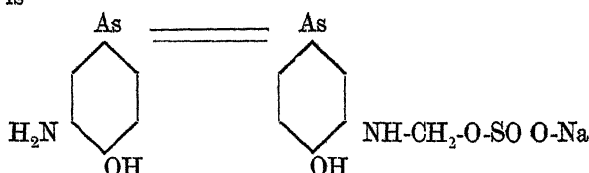
A Serbian soldier, whose red count was $1\frac{1}{2}$ million only, white count 3,600, haemoglobin 30 per cent and whose blood films contained nucleated reds but no malarial parasites, was given intramuscular

injections of 15 grains of quinine on three successive days followed by 20 grains by the mouth for six days. Two days later nucleated reds and a mononuclear increase were found and his red corpuscles were still under two million, the hæmoglobin being 40 per cent. An intravenous injection of 0.4 gram of galyi in 20 cc of saline fluid was given. He had a reaction with a temperature of 100.2° the same day. A week afterwards his red corpuscles had risen to 3¼ million and his hæmoglobin to 65 per cent. The nucleated reds were fewer. The dose of galyi was repeated twelve days after the first. A count made nine days later showed that the red cells had increased to 4 million, the hæmoglobin to 80 per cent and no nucleated erythrocytes were present in the films. When seen six months later he was in good health and had had no relapse.

C B

DUROEUX (L), LEHNHOFF-WYLD (F) & COUSERGUE **Méthode rationnelle d'emploi des sels arsenicaux. Ses résultats dans le traitement du paludisme par le Sulfarsénol**—*Progres Méd* 1920 Feb 21 No 8 pp 85-89

The authors have experimented with sulfarsenol for two years and during ten months they have used it in the treatment of malaria. [In *Annales des Maladies Veneriennes* 1919, Sep, Vol 14, No 9, pp 320-358, is to be found their description of sulfarsenol. It is salvarsan, dioxy-diamido-arsenobenzene, in which one of the amide groups is replaced by monomethylamine sodium sulphite, thus its formula is



Numerous experiments on mice and rabbits shewed that it is more active and three or four times less toxic than the other derivatives of salvarsan. In man there is perfect tolerance in doses up to 0.9 gramme. It is readily soluble in water. They had given 20,000 injections of Neosalvarsan, "914," and three deaths had resulted from toxic jaundice.]

Forty five cases of ague were treated with injections of sulfarsenol. In fifteen of these the first dose was 0.12 gm gradually increasing to 0.48 gm at intervals of five, ten and fifteen days. Relapses occurred in six during this course, and in three within two months of the last injection.

Progressively increasing doses of from 0.06 to 0.48 gm were given at three to six day intervals to fifteen patients. Four suffered from relapses during the treatment and one three weeks after its completion. To the remaining fifteen three small injections of 0.12-0.18 gm were administered in the twenty four hours, repeated four or five days later on several occasions. Relapses were noted in two only in the third week and none afterwards. The authors therefore conclude that arsenical concentration is indispensable for the destruction

of parasites and that time is also an important factor. Hence it results that fractional doses repeated at intervals of a few hours are more effective than larger doses more widely spaced. No accident has occurred in the use of this remedy, and by-symptoms and signs of intolerance have been fewer when it has been injected into the muscles or under the skin than when introduced into the veins. *P. falciparum* is more resistant to sulfarsenol than are *P. vivax* and *P. malariae*. A case of haemoglobinuria improved under its use.

C B

VICKERMAN (P. S.) **The Intravenous Injection of Eusol in Subtertian Malaria**—*Jl. Roy. Army Med. Corps* 1920 Jan Vol 134 No 1 pp 57-60

Eusol should be freshly prepared with chloride of lime containing 22 per cent available chlorine, and must be standardised by mixing a few ccs with an equal volume of a watery solution of 3.86 grams of arsenious oxide and 15.6 grams sodium bicarbonate to the litre. White blotting paper soaked in potassium iodide 0.1 gram, starch 1 gram, water 100 cc, is used as an indicator. If a drop of the mixture causes a blue color on the paper, the eusol contains 0.5 per cent of hypochlorous acid. Should the paper remain colourless, the hypochlorous acid is less than 0.5 per cent. Eupad, prepared at the Edinburgh University, was satisfactory. The maximum dose of eusol is 60 cc, 100 cc injected in a case of septicaemia, caused jaundice and suppression of urine for two days. The eusol is injected into the veins by means of a funnel and tube. Saline fluid is first run in, followed by 40 cc of filtered eusol, and after that more saline. Seven cases in which the subtertian parasites were found, were thus treated. In two no observations are recorded later than 12 days after the eusol. In the third case rings were discovered a week after the first dose of eusol, but were not detected 11 days after the second injection. Crescents and rings persisted in the fourth case for a fortnight after injection, but were not found on two occasions during the next month. In the fifth case parasites were present 26 days after the first dose and 20 days after the second. 100 cc of weak eusol were then administered. Four and five weeks later the blood films were negative. In the sixth and seventh cases the parasite was not discovered 34 and 59 days after the eusol. Three cases of malarial cachexia and anaemia, each of whom was treated with 40 cc of eusol, were restored to health in from one to three months.

C B

STROSS (Max) **Das weisse Blutbild bei chronischer Malaria mit besonderer Berücksichtigung der Monozyten** [The Leucocyte Count in Chronic Malaria with Special Reference to the Monocytes]—*Berlin Klin. Woch.* 1919 Dec 1 Vol 56 No 48 pp 1135-1137

PAPENHEIM groups together the large mononuclears and EHRLICH's transition forms and gives them the name "monocytes" [In *Folia Haematologica*, 1919, July and August, Bd XXIV, Heft

1 & 2 pp 1-26, is PAPFENHEIM's last article on normal forms of leucocytes, with numerous coloured plates. Among the monocytes are depicted some with deeply indented nuclei, which would usually be regarded as polymorphonuclears. His classification appears to be confused and artificial.]

Stoss found that the total leucocyte count in 31 out of 53 cases of chronic malaria was somewhat high, being 9,000 per c mm, and in 13 of these it was 12,000. In 6 only was it less than 6,000. Classifying the white cells into polynuclears, lymphocytes, and monocytes, he finds that the relative percentage in which they occur does not always correspond with the absolute number per c mm. Thus there was a relative monocytosis of 10 per cent and over in 15 cases only, but there was an absolute monocytosis of 350 per c mm and upwards in 50. In 16 of these more than 800 monocytes were present in each c mm. In 11 malaria carriers the total white count averaged 9,297, 79 per cent of which were monocytes, that is 731 monocytes per c mm. In chronic tertian ague an absolute increase of monocytes to about 1,000 per c mm appears on the day before the attack. After several consecutive seizures a temporary neutrophile leucopenia occurs followed by a neutrophile leucocytosis on the second day after the onset. The lymphocytosis of about 5,000 lymphocytes per c mm, which sets in after the ague attack, lasts for about a week.

C B

LAWSON (Mary R.) *Crescentic Bodies in Aestivo-Autumnal Malaria, Their Migration and Attachment to the Surface of the Red Corpuscle*—*Jl Experim Med* 1920 Feb 1 Vol 31 No 2 pp 201-207 With 2 plates

Many bold assertions are made in this paper, such as,

"All malarial parasites are extracellular. Each parasite destroys several red corpuscles. A heavily pigmented, full grown parasite attached to a red corpuscle the haemoglobin of which is intact, or nearly so, should suggest that the parasite must have obtained that pigment from another source, and that source was undoubtedly another red corpuscle. The parasite is extracellular and wraps itself around the corpuscle as a worm wraps itself around a berry. Crescentic bodies go through migratory stages similar to those of other malarial parasites and it is possible to find all the stages in one film especially if the infection is a heavy one and quinine has not been given."

The writer nowhere states that her conclusions are based on observations of the living plasmodia, and it seems that she reads life history into the appearances presented in stained films. The illustrations, many of which are blurred and indistinct, are capable of interpretations other than those assigned to them in the text.

C B

CHALMERS (Albert J) & ARCHIBALD (R G) *The "Tenu" Phase of Plasmodium vivax (Grassi and Feletti 1890)*—*Jl Trop Med & Hyg* 1920 Feb 2 Vol 23 No 3 No 3 pp 33-36 With 1 chart & 2 plates

Rings bearing fine pseudopodia, described as the "Tenu" phase, are represented in the plate. The authors believe that it signifies

an attempt at reproduction by fission. They were unable to find any traces of migration of the plasmodium reported by LAWSON. This "Tenue" phase has been observed previously in subtertian infections only. After treatment with 45 grains of quinine hydrochloride for three days combined with 9 minims of liquor arsenicalis for two days the patient developed a scarlatina-like rash accompanied with fever and sore throat and followed by desquamation. The "dermatitis scarlatiformis" was attributed to the effects of the quinine which was excreted in the urine for seven days after discontinuing it.

C B

PONTANO (Tommaso) Sulla riproduzione dei macrogameti di *Plasmodium vivax* nel circolo sanguigno—*Policlinico Sez Med* 1920 Jan Vol 27 No 1 pp 36-44 With 1 plate

Blood taken during the first hour of a relapse of benign tertian ague after an interval of several months contained *P vivax* in various stages, some sporulating. Besides adult gametocytes, round or oval forms described as extraglobular were seen. These were 10-12 μ in diameter, and when stained by Giemsa were divided by a colorless narrow crescent into a dark blue portion in which were 12-20 large deeply stained masses of chromatin, and a light blue part containing pigment granules towards the periphery and a delicate semilunar light pink network of chromatin situated near the color-free crescent. The author regards these as gametocytes of *P vivax* in the phase of reproduction.

(The two plates which he gives are identical with Fig 2 in the Plate which illustrated J D THOMSON's paper "Notes on Malaria" *Jl Roy Army Med Corps* 1917 Oct Vol 30 No 4 pp 379-411, showing the combination—gametocyte and schizont of *P vivax*.)

C B

SWELLENGREBEL (N H) Méthode de recherche de rares parasites du paludisme dans le sang périphérique—*Bull Soc Path Exot* 1920 Jan 14 Vol 13 No 1 pp 20-21

The oocysts of *P vivax* can be identified by their fine yellowish brown pigment. This is a constant character most marked when they are young and in great contrast with the coarse black pigment of *P falciparum* oocysts. The pigment of quartan oocysts is intermediate between the two. *A ludlowi* transmits *P falciparum* most readily, *P vivax* rather less so and shows little affinity for *P malariae*. *A sinensis* on the other hand favours the *P vivax*. *A umbrosus* is a feeble host of *P vivax* only [see this *Bulletin*, Vol 14, pp 64]. All the *A ludlowi* which sucked the blood of a carrier of many crescents were infected, and two of them conveyed subtertian ague to two persons who submitted to their bites, but benign tertian oocysts were found in two out of 15 *A sinensis*, and in 2 out of 68 *A umbrosus* which had fed on the crescent carrier. Hence it was concluded that this man was doubly infected. In another experiment 32 *A sinensis* and 53 *A. umbrosus* fed on the blood of a man which microscopically contained crescents only. The *A umbrosus* were refractory, but 16

of the 32 *A sinensis* developed benign tertian oocysts and conveyed this fever to a man after an incubation stage of 12 days, and in 9 subtertian oocysts were found, the infection being double in 8 of these. Hence this man also harboured both *P falciparum* and *P vivax*.

C B

THOMSON (J Gordon) **Experiments on the Complement Fixation in Malaria with Antigens prepared from Cultures of Malaria Parasites (*P falciparum* and *P vivax*)**—*War Office Observations on Malaria by Medical Officers of the Army and Others* 1919 Dec pp 80-94 [London H M Stationery Office]

The methods employed by the author, who is Head of the Malaria Laboratory of the 4th London General Hospital and Protozoologist of the London School of Tropical Medicine, were described in this *Bulletin*, Vol 13, pp 87-88, and Vol 15, pp 130-131. Of the sera of 19 cases harbouring *P vivax*, examined with an antigen prepared from a single strain of *P vivax*, 11 gave a positive, 7 a weakly positive and 1 a negative reaction, although the blood contained numerous parasites. Experiments were conducted for the purpose of determining if specific antigens could be prepared for benign and malignant agues. Three cases of *P falciparum* infection reacted to the *P falciparum* antigen but were negative to the *P vivax* antigen. One case of benign tertian was positive to both. Four *P vivax* and two *P falciparum* sera were positive to a spleen antigen of *P falciparum*, and were also all positive, with the exception of one *P falciparum* serum, to a benign tertian antigen. Twenty-two *P vivax* and five *P falciparum* sera gave positive responses to an antigen composed of ten strains of *P vivax*, with the exception of one. In this case the blood was drawn during a benign tertian paroxysm and contained numerous parasites. Sixty-six experiments were carried out to determine the influence of quinine on complement deviation. In 52 of these the sera remained positive in spite of long treatment, 14 became negative, but it is not known whether these relapsed or not. The presence of quinine in the blood has no effect on the test. The bloods of 8 cases showing a mononuclear increase of 6 per cent and over were positive, and of two under 6 per cent negative.

C B

FORSYTH (Charles E P) **Quinine Prophylaxis and the Treatment of Malaria in a Coolie Population. A Contribution from Assam** *Ind Med Gaz* 1920 Jan Vol 55 No 1 pp 12-14 With 1 chart & 1 diagram

Between the years 1912 and 1917 the malarial incidence in 10,000-16,000 coolies at Tezpur varied from 131-154 per cent per annum. During this period each individual was supposed to take ten grains of quinine a week—20 grains weekly in some gardens—from May to October, but many evaded this. Only about half of the estimated number of tablets required was issued. A careful experiment was then made. In the most malarious spot 1,151 coolies were given

no quinine from March to July, quinine from August to October, the ague rate was 32.2 and 28.4 per cent respectively. The incidence in 666 controls who received no quinine was 19 per cent March to July and 18.8 per cent August to October. In November among 532 subjected to quinine prophylaxis, the ague-rate was 33.6 per cent, against 29 per cent in 619 controls. Accordingly quinine prophylaxis was abandoned in the Labour Force of 16,960 during the year 1918, but the treatment and after treatment of ague was more thorough. Each patient attacked was given 85 grains of quinine in the first week of his illness. The supervision of the child population was more strict. Anti-mosquito measures in Assam are attended with great difficulties and can be partial only. The ague rate fell in 1918 to 85 per cent. [Compare the results obtained by LINNELL on rubber estates, this *Bulletin*, Vol 6, p 329]

C B

FEDERATED MALAY STATES **Malaria Bureau Reports** 1919 Nov
Vol 1 By HACKER (H P) Medical Entomologist 76 pp
with 22 Illustrations & 2 plans 1919 Singapore Printed
at the Methodist Publishing House

These reports contain an account of the anti-malarial work which has been undertaken in connection with the Railway.

Anopheles maculatus is the most important carrier in hilly country, *A. aconitus* and *A. fuliginosus* in open swampy places, and *A. umbrosus* in low-lying jungle. It has not however, been proved that the other species are harmless. *A. maculatus* breeds in inconspicuous spots, shallow wells, ditches, puddles, disused tins, etc., though it prefers fresh spring and seepage water. All along the railway it finds suitable breeding places. In common with *A. sinensis* it is a light-loving species and is not found in jungle-covered ravines, nor will it breed under the shadow of secondary jungle growth, but a very small open area satisfies its needs. *A. karwari* is not so dangerous as *A. maculatus* though its larvae and habitats are similar. Clearing the jungle is immediately followed by an invasion of *A. maculatus* into the sun-lit area. The growth of vegetation producing uniform shade is an important preventive measure. Momentary contact with fresh oil immediately destroys larvae. Exposure of the oil on the surface of water lessens its activity therefore its daily application is more successful than when it is applied weekly. A continuous oil film on the surface of the water is not essential for the destruction of larvae. At Gemas 61 per cent of 132 persons examined had either enlarged spleens or were carriers. The haemoglobin index is a useful guide in estimating capacity for work. The average percentage in 41 ague-free adults was 89, and in 56 malarial subjects 79.

C B

EVANS (W) **Anti-Malarial Work with the Australian Mounted Division in Palestine. Its Relation to the same Problem in Australia.**—*Med Jl Australia* 1919 Dec. 20 Vol 2 No 25 pp 526-529 With 1 map in text

Malaria was one of the greatest factors in causing Napoleon's defeat in Palestine a hundred years ago, and it played a part in the overthrow

of the Turks in 1918, for the writer found the Turkish hospitals crowded with ague-stricken patients, many of whom, and a large proportion of the Turkish prisoners, were extremely weak and cachectic. Our advance began at the end of 1917 and terminated in the capture of Jerusalem and the occupation of the Jordan valley which it was necessary to hold during the summer. The valley is here eleven miles wide, 1,300 feet below sea level, with mountains 4,000 feet high on either side. The Wadis Mellahah, Aujah, and Nieuameh join the Jordan. The Wadi Mellahah rose in the Turkish lines and expanded into swamps for two miles swarming with anopheline larvae. Anopheline ova also were found in chains like streptococci. Although the Wadi Aujah was a clear and rapid stream anopheline larvae were seen among the pebbles. Irrigation canals proceeded from both wadis which also were prolific breeding places, but when cut off they soon dried up. A thousand men were employed in cutting a channel two feet wide in the Wadi Mellahah swamp, and in filling in pools. A large pool near the banks of the Jordan was pumped dry. All the weeds in the Wadi Aujah were removed, banks repaired and irregularities removed. Oiling was not necessary for open wind swept collections of water if kept free from weeds, but was used elsewhere. The intense heat prevented the use of veils and nets. Quinine prophylaxis, 0.6 gram of the sulphate in solution, appeared at first to reduce the ague-rate to one half of that of the controls, but afterwards no difference was observed. Malaria began with the advance, and during each week of the occupation of the Jordan Valley 2 per cent of the troops were evacuated on account of malaria. An Australian brigade spent two nights in the Turkish lines after the break through in October 1918. Within a fortnight 75 per cent of them were attacked with ague.

In Australia anopheles and culex breed throughout the whole of the Murray River Irrigation area. Sporadic cases of malaria already occur in New South Wales. Supervision must be exercised over the 18,000 potential malaria carriers who have returned from Palestine.

C B

YOFÉ (Hillel) *Campagne antipaludéenne en Galilée*—*Rev Méd d'Hyg Trop* 1914 Vol 11 No 2 pp 120-128 With 1 map [Received January 1920]

Galilee is more malarious than Judæa, though there are districts in the former which are exempt. The valley of the Jordan and of the Lake of Tiberias, the great swamp of Houle, north of Lake Merom, and the marshes on the sea-coast are highly malarious. At the end of 1910, 0.25 gram of quinine hydrochloride was given to all the 70 inhabitants of the Jewish colony at Athith which lies 15 kilometres south of Caifa, and in 1913, oiling of pools was begun. In 1909 there were recorded 430 attacks of ague in the months August to September, and 380 during this period in the following year, and only 11 of the inhabitants had spleens which were not palpable. Blackwater and

pernicious fevers had been of yearly occurrence. In 1913 these had disappeared, the splenic index was 33 per cent only, and no more than three out of 62 persons examined harboured the parasite. Yessode and Mischmar are two Jewish settlements on the borders of Lake Merom. The neighbouring country has become depopulated by malaria and the few inhabitants who remain are cachectic and have enormous spleens. Daily doses of quinine and oiling collections of water where practical has resulted in reducing the splenic index of the 70 inhabitants of Mischmar from 92 per cent in 1912 to 35 per cent in 1913, and that of the 200 inhabitants of Yessode from 85 to 45 per cent. Moreover at Mischmar only 3 out of 51 and at Yessode 6 out of 124 were found to be carriers in September 1913. There had hitherto been 8-12 cases of blackwater fever every year. Two only occurred in 1913. In the more healthy Jewish colonies of Zagron and Jakob, with a population of 950, the oiling was carried out every fortnight, with the result that the anophelines became much less numerous. Quinine prophylaxis was employed. The splenic ratio fell from 45 per cent to 17 per cent in 1913, and blackwater and pernicious types of fever ceased.

At Athth *Anopheles maculipennis* are scarce from February till the middle of April; they then rapidly increase until June, are not so numerous from June to September but their number augments quickly until the rains in November. At Yessode and Mischmar June, July and November are the months when they abound excessively. The larvae in September are green.

C B

PARROT. *Hydraulique Agricole et Paludisme*.—*Rev Méd d'Hyg Trop* 1914 Vol 11 No 2 pp 81-83 [Received January 1920]

The extension of the practice of irrigation in the plain of Bone may cause outbreaks of ague, unless the surface of the réservoirs is freed from weeds and oiled, the main channels concreted, the distribution channels doubled, so that one may be always dry, and precautions taken that the soil shall not become water-logged.

C B

RÉGNAULT (Félix). *La culture des lentilles d'eau dans la lutte contre le paludisme*.—*Bull Soc Path Exot* 1919 Dec Vol 12 No 10 pp 735-736

In 1917 near Ajaccio in Corsica the pools which were covered with duckweed remained free from mosquito larvae, which swarmed in those where this growth was absent. The author ascertained that duckweed will only grow in foul water. After polluting the mosquito swarming pools and planting duckweed, the larvae vanished. The duckweed, however died as soon as the organic matter was used up. He repeated the experiments several times with the same result.

C. B

ROBERTSON (J C) A Short Report on the Anti-Malaria Campaign at Taranto during 1918—*War Office Observations on Malaria by Medical Officers of the Army and Others* 1919 Dec pp 149-177 [London H M Stationery Office]

In the summer of 1917 it was necessary to form a large rest camp at Taranto in Southern Italy. It was known to be malarious and anti-mosquito measures and prophylactic treatment with quinine were inaugurated. These were not effectively carried out, for there was an ague incidence rate of 14 per cent in the 1,573 troops stationed there between May 18th and Oct 31st, 1917, and there were six deaths. Although provided with nets many of those attacked neglected to use them. The mean temperature from May to October ranges between 70° and 80° F hence this was the probable explanation of their disease. In January the anti-mosquito personnel of 9, afterwards increased to 41, including an entomologist and an officer, was occupied in killing hibernating mosquitoes, and in oiling and draining breeding places. The porous limestone overlying clay caused the surface to be constantly wet in places. These were under drained and the discharging water was oiled by an automatic drip at the outfall. All ditches also were regraded and cleared by the R E. To 57 of 170 wells pumps were supplied. Mosquito proof lids were fitted to the others, with the exception of those used for irrigation, the water of which was oiled weekly. The number of anophelines caught in the huts and tents fell rapidly from January to April, after which none were captured till June. The subsequent catches remained low. *Anopheles maculipennis* was numerous in the ditches and marshes, *A bifurcatus* in the wells and troughs. The former were more prevalent in the latter part of the year, the *A bifurcatus* in the spring. The stomachs of 74 and the salivary glands of 12 out of 949 mosquitoes examined were infected. *A maculipennis* was more often a carrier than *A bifurcatus*. The first infection was found on June 24th 1918 and the latest on November 25th 1918. Some houses were infested with mosquitoes which had probably come from a breeding place 2,000 meters away, for as soon as this was oiled the houses remained free. During the year 1918 there was only one undoubted case of ague contracted among the 2,398 troops in the rest camp. Mosquitoes were however very numerous outside the protected area, for instance 24 out of the 53 men of the Italian Anti-aircraft Battery situated close to the camp, were attacked with ague during the first seven months of 1918. Fifteen infections among our troops are regarded as arising from visits to the surrounding malarious districts. No fresh seizure was noted among the 3,242 British West Indians during the ague season of 1918.

C B

COMESSATI (G) Note di profilassi antimalarica—*Riv Crit di Clin Med* 1919 July 19 Vol. 20 No 29 pp 337-344

The author states that under war conditions on the lower Isonzo, Taghamento and Piave, quinine has shown itself on the whole inefficient as a prophylactic against malarial infection. "In the 23rd Army Corps, spread over the Lower Piave in the summer and autumn

of 1918, whole Companies, treated with quinine in daily doses of 12 grains, contracted malaria." In August and September of 1918 the Italian troops among the swamps and inundations of the Lower Piave were exposed during the whole of every day to repeated and intensive injections of malarial virus. "In these conditions" states the author, "the only defensive weapon in use has been quinine and it has not proved equal to its task." In the vast diffusion and intensification of malaria caused by the war Italy is faced by an after war problem of immense gravity and urgency, in the solution of which it will no longer be possible, in view of the expense involved, and of its proved uncertainty, to regard quinine prophylaxis as a method of prime importance.

For obvious reasons mechanical prophylaxis, of the utmost value where applicable, cannot, in view of the enormous number and wide dispersal of gametiferous subjects, assume the position of a fundamental method. "Drainage therefore," concludes the author, "hydraulic and agrarian in combination with all known methods of combating the anopheles, must hold the first place, as it alone deals with the evil at its roots and promises sure and permanent results which would not only free Italy from the scourge of malaria but give agrarian value to swampy land which makes dreary and depressing large areas of Italian soil."

F S Arnold

Rizzi (Michele) *Malaria debellata in Trinitapoli* [Malaria conquered in Trinitapoli]—*Malarologia* 1919 June 30 Series 1 Vol 12 No 1-2-3 pp 47-53

An account of an intensive anti-Anopheles campaign carried out during 1917 and 1918 with a view to the protection of the town of Trinitapoli in S Italy. The conditions during the year 1917 were all favourable to the success of the campaign. Ample means were provided by the Sanitary Authority, the temperature and the rains were normal and the result was correspondingly satisfactory. In 1918 there was a great change in the conditions which added immensely to the difficulties of the work. The chief complicating factors were three: (1) an abundant generation of anophelines in February owing to an abnormally hot spell lasting a fortnight, (2) the discovery of a large sheet of stagnant water in which the anopheles could not be dealt with directly owing to its being surrounded by a broad belt of swamp, (3) an abnormally rainy season resulting in the formation of innumerable pools and puddles. The author inaugurated an intensive campaign against the anopheles itself, the incessant rains rendering hopeless any attempt at a thorough removal or petrolization of anopheligenous foci. In the matter of the above mentioned sheet of water he appealed for help to the Corps of Civil Engineers (*Genio Civile*), who, having determined a slight difference of level between it and a lagoon known as the Lago di Salpi, put on a large body of workers to dig a canal between the two and thus brought about not only the draining of the pond but the salinification of certain remaining pools when, later on, the salt waters of the lagoon rose above their usual

level The result of the work, as affecting the town of Trinitapoli, is given by the author in tabular form

	Notifications		Deaths		
	Relap-es	Pr mary	Over 1 year	Under 1 year	
1916	Innumerable		196		During 1915 & 1916 the whole population (14000) was attacked
1917	1712	14	50	2	
1918	823	23	6	2	

F S A

CREMONESE (Guido) **Le questioni pratiche controverse nella profilassi della malaria** [Controverted Questions in Connection with the Practice of Malaria Prophylaxis]—*Malarologia* 1919 June 30 Series 1 Vol 12 No 1-2-3 pp 3-39

From April to June 1917 about half of the 680 inhabitants of Fiumicino were probably malarial carriers. They were subjected to a 15 days' intensive course of quinine preparations, followed by 15 days' treatment with reduced doses. Nevertheless more than 46 per cent of them were attacked subsequently. Anopheles appeared in April. The first fresh infections in infants of under a year were noted towards the end of June.

C B

MANDOUL (H) **Une Mission antipaludique dans la XVII^e Région (1917-1918)**—*Bull Soc Path Exot* 1919 Dec Vol 12 No 10 pp 779-798

A. maculipennis is widespread up to a height of 1,000 metres above sea-level in the six Departments of the XVII District, Haute-Garonne, Ariège, Tarn et Garonne, Lot, Lot et Garonne, and Gers. Although their presence has been known for the last fifty years, there has been no ague until recently when two cases were reported. The hibernation of the mosquitoes takes place in the adult stage. Anopheline larvae appear in June and multiply rapidly from the end of July or the beginning of August. Culicine larvae are seen in February and persist till November after the anopheline have disappeared. Anopheline larvae are commonly found in cisterns and ornamental waters of the towns. Duckweed checks them and watercress beds are unfavourable breeding places. The carp and tench are great destructors of mosquito larvae which may, however, escape if there are water weeds to serve them as cover. Anopheles are most numerous when the temperature ranges between 57° and 87° F.

C B

- i ROBERTSON (R K) The Treatment of Malaria [Correspondence]—*Brit Med Jl* 1920 Feb 7 pp 199-200
- ii BALMAIN (Augustus R) The Treatment of Malaria [Correspondence]—*Ibid* 1920 Mar 13 p 381
- iii ARTAULT DE VEVEY (S) Action elective de l'alcoolatura de Buis contre les fiebres intermittentes tardives de Salonique—*Bull Acad Méd* 1919 Dec 23 Vol 82 No 41 pp 508-509

i Doubt is expressed whether medical men who have suffered from ague will submit to the long course of after treatment with quinine now insisted upon

ii The writer was in the East African Expeditionary Force, and he states that the method of administering quinine by intra muscular injections was condemned by the E African Medical Service on account of the necrosis of muscle which resulted

iii Tincture of *Buxus sempervirens* was given to five soldiers who developed ague after their return from Salonica. In one, to whom large intramuscular injections of quinine in olive oil had been administered, there was no relapse for a year. The after history of the others is not recorded

C B

BLACKWATER FEVER

MASTERS (Walter E) **The Aetiology of Blackwater Fever** *Jl Trop Med & Hyg* 1919 Aug 1 Vol 22 No 15 pp 146-147

In the author's opinion "a malarial toxin is a *sine qua non* for blackwater fever, but it is not a sufficient cause in itself to cause a solution of the red cell membranes. Some other toxin must also be present"

In some of Masters' cases the extra active factor has been —

- 1 Quinine, irrespective of its variety of salts
- 2 Galyol, neosalvarsan, and kindred preparations
- 3 Male fern, followed by alcohol

W Yorke

MOORE-ANDERSON (A P) **Blackwater Fever Some Cases met with in Central Africa during the War**—*S African Med Rec* 1920 Feb 14 Vol 18 No 3 pp 43-48

During the recent campaign in Central Africa 17 cases of blackwater fever and 8 convalescent cases came under the author's care. The shortest period of service in the tropics noted was nine months, and the longest "for the first attack" eight years. The age of the patients varied from sixteen to thirty-seven years. In all, except one, there was a definite history of malaria, the exception was the case of a boy of sixteen whose statement the author considers must be accepted with reserve. In 9 cases the haemoglobinuria developed when the patient was suffering from an apparently typical attack of malaria. A blood examination was made in only one of these cases, a heavy subtertian infection being found. With regard to the relationship of quinine to the condition, the author states that he has definite information in respect of 21 of the cases. 9 had taken the regulation daily dose of 5 grs daily, 5 had taken it "pretty regularly," 5 admitted complete irregularity, and 2 took none at all except when ill. With reference, however, to the question of quinine being, in some cases, the actual exciting cause of the haemoglobinuria, the author can express no opinion, as he has no accurate note of the dose taken immediately preceding the onset of the attack.

A general account of the symptoms observed and of the course of the disease is given, as are also clinical details of a number of the cases observed.

W Y

HOUSIAU (M) **De la double forme clinique et du traitement Hémoglobinurique**—*Presse Méd* 1919 Nov 15 Vol 27 No 68 pp 685-686

During his work at Leopoldville, the author has had the opportunity of observing some twenty cases of blackwater fever. He concludes that there are two well defined forms of the disease which ought to be treated differently, viz, Form A, Haemoglobinuria appearing during a violent paroxysm of malaria in a patient already infected with this disease, and Form B, Haemoglobinuria appearing in a case of chronic

malara or the result of a secondary cause, which of itself does not entail destruction of erythrocytes, but contributes indirectly to the production of the haemolytic process. The clinical differences between the two forms are summarised by the author as follows —

<i>Form A</i>	<i>Form B</i>
Shivering	No shivering
Vomiting	No vomiting as a rule
Temp 39.5° to 40.5° C	Temp 38.5° to 39.5° C
Agitation, slight delirium	Quiet, no delirium
Urine scanty and rose coloured	Urine abundant, almost black
Slight icterus	Marked icterus
Pulse accelerated	Pulse slightly accelerated, depressible
Heart sounds of normal intensity	Heart sounds of diminished intensity

Experience shews that Form B is the more dangerous. A detailed account of the treatment recommended by the author follows. In both forms a preparation is given consisting of infusion of senna and sulphate of soda. In Form A an injection of 20 cgm of the chlorhydrate or sulphate of quinine is administered and in Form B an injection of camphorated oil.

W Y

PHEAR (A G) Notes on Blackwater Fever in Macedonia—*Jl Roy Army Med Corps* 1920 Jan Vol 34 No 1 pp 1-14 With 15 charts

During the year ending October 31, 1918, a hundred and thirty six cases of blackwater fever were reported among the British troops in the Salonika Command, of these 36 died, giving a mortality of 26.5 per cent. A graph is given shewing the number of cases reported monthly, the great majority, 116, occurred during the months December to April.

Nearly eight times as many cases occurred in the year ending October 31, 1918, as during the previous twelve months. This cannot be explained altogether on the hypothesis that the tendency to blackwater is greater in those who are in their second season of malaria, as out of 47 cases in which precise information is available in only ten did the first attack of malaria date back to twelve months or more before the onset of blackwater, in 24 cases (nearly 50 per cent) the first attack of malaria fell within six months of the occurrence of blackwater fever.

As regards the aetiology of the complaint the outstanding feature is the constant association of malaria as an antecedent condition, but apart from this general relationship there was found in the majority of cases, no evidence of active malaria accompanying the actual attack of blackwater. Of 58 cases in which careful search was made, in 16 only (27 per cent) were parasites found during an attack—7 were *P. vivax*, 4 *P. falciparum*, 5 were of an indeterminable type.

The author obtained no evidence in support of the hypothesis that the determining cause of an attack of blackwater is quinine, on the contrary, the facts are opposed to this hypothesis. Included in the series is a number of cases in which quinine as an exciting cause can be definitely excluded, as during a considerable period previous to

the onset of blackwater no quinine had been given. Again, cases of severe blackwater occurred in which the condition cleared completely and rapidly, notwithstanding the administration of quinine in large doses [This is a well recognised fact which has repeatedly been pointed out, and does not prove that quinine did not cause the attack, nor does the previous statement prove that quinine is not the determining cause in many, if not most, cases]

An account is given of the symptoms exhibited by the cases and of the treatment administered. In illustration of his remarks on symptomatology and treatment, notes and temperature charts of fifteen cases, are recorded

W Y

RUSZNYAK (Stefan) *Zur Therapie des Schwarzwasserfiebers.*
[The Therapy of Blackwater Fever]—*Wien Klin Woch*
1919 Sept 18 Vol 32 No 38 pp 943-944

In view of the unsatisfactory results obtained by the author with MATKO's method of treatment of blackwater fever and of the latter's criticism of his technique [this *Bulletin*, Vol 13, p 303], Rusznyak tested the method again in a third case and this time with satisfactory results

Details of the case are as follows—The patient, aged thirty two contracted malaria in Albania in August, 1916, he had many relapses the last being on the 15th July, 1918. On admission to hospital 20th July, he was somewhat emaciated and moderately anaemic, the heart, lungs and urine were normal, the spleen reached a hand's breadth below the costal margin

22nd July After breakfast quinine 1 gm per os was given. At midday there was a rigor and great haemoglobinuria. Icterus developed, red corpuscles, 2,450,000, haemoglobin, 32 per cent, leucocytes, 8,600

23rd July A high degree of haemoglobinuria and high fever. At 5 p.m. an intravenous injection of 400 cc of salt solution ($\text{NaCl} + \text{Na}_2\text{HPO}_4$ each three per cent), was administered. At 8 p.m. the haemoglobinuria was distinctly less

24th July Temperature normal, urine free from haemoglobin, trace of albumen, icterus less, haemoglobin in blood 35 per cent

3rd Aug Urine normal, haemoglobin 52 per cent

3rd Sept Haemoglobin 70 per cent

15th Sept Malaria parasites appeared in blood

25th Sept Quinine 3gm intravenously, no reaction

28th Sept Quinine 6 gm intravenously, no reaction

29th Sept Quinine 1 gm on full stomach was well borne

In view of this favourable result, the author declares that he desires to recommend the use of MATKO's treatment in blackwater fever [The author is easily satisfied]

W Y

MUÑOZ (Fernando R) *Le cyanure de mercure dans la fièvre bilieuse hémoglobinurique*—*Bull Soc Path Exot* 1920 Jan 14
Vol 13 No 1 pp 35-37

At Ceiba, Honduras, the author has had the opportunity of observing many cases of haemoglobinuric fever at one period of the year

are encountered. The author claims to have cured five cases of the disease by intravenous injections of cyanide of mercury in doses of 5 cgm which, he believes, exerts a specific effect. In the first case, a single injection was given, in two cases a couple of injections, and in the other two three injections.

[This note is open to the same criticism as most previous claims of a like kind, the fact that these five cases recovered proves nothing in view of the fact that about 80 per cent of all cases of this disease recover whatever form of treatment be given.]

W Y

COENEN (H) Soll man bei Schwarzwasserrfieber lebendes Blut ueberleiten? [Should Transfusion of Living Blood be performed in Blackwater Fever?]*—Muench Med Woch* 1919 Mar 14 Vol 66 No 11 pp 286-287

Transfusion of blood was performed in the case of a patient who was extremely anaemic and practically moribund as the result of an attack of blackwater fever. About twenty minutes afterwards great improvement was noted. It was possible to converse with the patient; the pulse became strong and full but remained rapid (100 per minute) and the dry tongue became moist. Urine, which was passed during the transfusion, was normal in colour. Three hours later there was a relapse, blackwater being again voided; the patient steadily became worse and death resulted.

The author is of the opinion that the reason why, notwithstanding the initial good effects of transfusion, the life of the patient was not saved, is to be explained by the fact that in blackwater fever, unlike other conditions, the destruction of blood continues. Consequently, if transfusion is useful in certain cases of blackwater where the paroxysm is over, or almost over, in other cases it should not be given because there is the possibility of further haemolysis due to the toxin of blackwater fever.

W Y

WILLIAMS (J P) Blackwater Fever*—Lancet* 1919 May 24 pp 886-887. Also *Jl Trop Med & Hyg* 1919 Aug 1 Vol 22 No 15 pp 145-146

An account is given of the treatment of ten cases of blackwater fever which have been under the author's care in the Gold Coast during the past four years.

The following are the conclusions —

"1 The previous history in each case tends to show that the blackwater fever of West Africa is a manifestation of recurrent and inefficiently treated malaria. This is further supported by the fact that immediate and repeated intramuscular injections of quinine, combined with galyl injected intravenously and vigorous hydrotherapy, are a satisfactory treatment.

"2 The prophylaxis of blackwater fever is essentially that of malaria.

"3 In galyl we have an important remedy, since it apparently has (a) a stabilising effect upon the haemoglobin, and therefore is antihæmolytic, (b) an antiparasitic action, and (c) an accelerating effect on the production of red blood corpuscles. In one grave case in which it was successfully used the haemoglobin (Tallquist) was only 20 per cent of the normal. Further, in no case of blackwater fever in which I have used it have any ill

"4 No person who has suffered from blackwater fever should return to an endemic area until after at least four months spent in a temperate climate. The return should be conditional upon an undertaking being given faithfully to observe the conditions necessary for the prophylaxis of malaria, *e.g.*, the taking of quinine as a prophylactic according to a recognised system, and the proper use of a mosquito net. Otherwise there is a gravely liability to a second attack, which would probably prove fatal. Moreover, people who hold, as the above patients did, that it is not necessary to take quinine systematically in West Africa, are by spreading their pernicious doctrine, a danger to other Europeans."

W Y

ROBERTSON (J A) **Adrenalin in Blackwater Fever**—*Brit Med J* 1919 Aug 30 p 272

Adrenalin chloride should be given in 20 minim doses every four hours. "After the first three or four doses the urine clears up remarkably." In the author's opinion the explanation [of this remarkable action] is "probably the balancing of a suprarenal insufficiency, which insufficiency is perhaps the cause of haemoglobinuria in some cases of malarial infection."

W Y

NIERENSTEIN (M) **Haemoquinic Acid—A New Disintegration Product of Quinine present in the Urine especially in "Blackwater" Fever**—*Jl Roy Army Med Corps* 1919 Mar Vol 32 No 3 pp 215-217 With 1 fig

The urines secreted by malaria patients after the administration of quinine were mostly light in colour, but some dark specimens were observed, of 854 specimens examined 126 (14.76 per cent) were dark-coloured, suggesting the existence of some disintegration product of quinine. The dark-coloured specimens were examined for kynuric acid but with negative result. During this work a new disintegration product of quinine was discovered, this substance, which possesses pronounced haemolytic properties, is designated "haemoquinic acid."

The method of preparation and some of the properties of haemoquinic acid are described. It was detected in 12 of 13 blackwater urines. In the authors' opinion his observations suggest a possible relationship between the formation of haemoquinic acid in the organism and the production of blackwater. This relationship would be a specific "quinine idiosyncrasy" since, apparently, in blackwater fever haemoquinic acid is produced in larger quantities than in ordinary malarial rigor cases.

W Y

KALA AZAR

KNOWLES (R) Notes on some Results in Kala Azar —*Ind Jl Med.*
Res 1918 April Vol 5 No 4 pp 548-566

The paper records the treatment by intravenous tartar emetic of 20 cases of kala azar at Shillong during 1917. Of these 5 died (the death of the fifth case is recorded in a foot-note at the end of the paper) and 15 were discharged cured. The details of the cases are tabulated in a chart. In only one instance, a child of six, in which intravenous injections were very difficult and only sometimes successful, was the treatment supplemented by the oral or cutaneous methods. The test of cure was the absence of parasites from spleen smear and of flagellates from 3 to 6 culture tubes inoculated from material obtained by spleen puncture or, where the spleen had ceased to be palpable, from 6 to 12 tubes inoculated from the peripheral blood. Twelve of the cases were diagnosed by the finding of the parasite after spleen puncture but the remaining eight cases were typical of the disease. In all 29 spleen punctures were performed without accident. Twenty grains of calcium chloride solution were given the evening before puncture two hours before, and within half an hour after (ROGERS' method). In four cases the coagulability of the blood, as tested by Wright's technique just before the first puncture, gave readings of 3, $3\frac{1}{2}$, $3\frac{1}{4}$ and 3 minutes. In one case it was $4\frac{1}{2}$ minutes, so puncture was not performed.

One case is described in some detail as being the most interesting of the series. A Bengali girl of 14 had suffered from the disease five years. An attack of pneumonia in 1914 seemed to improve the condition so that she was free from fever for 8 months in 1915. When first seen on July 2, 1917, she was extremely debilitated with daily attacks of fever. Films from the spleen were full of Leishman-Donovan bodies. Intravenous injections were commenced on July 9, 1917. On August 15 cultures were obtained from the spleen. On November 9 smears and cultures failed to reveal parasites. The patient continued to improve and was discharged cured. The only medication apart from the injections was in the form of tonics.

As regards dosage 10 adult cases received on an average each 191 cgms, the actual totals varying from 118 to 213 cgms. The average number of days of treatment was 86. The injections were given every fourth day. The aim in treatment should be to give approximately 2 grammes of the drug during a three months' course of treatment. The heavy powder was used throughout. The elimination of the parasites is gradual for in one case they were still present after 68 cgms, were very scanty after 174 cgms and could not be found in smears or cultures after 206 cgms. Fever disappears after a fortnight's treatment and the drug is well tolerated during the first and second months when parasites are still present. During the third month the patients are more susceptible to the toxic action of the drug and only tolerate doses at longer intervals. Increase in weight is very marked in the later stages of cure. There may be an initial loss of weight but this is rapidly overcome. As a rule it is only towards the end of treatment that the spleen diminishes.

diminution in the size of the liver is not so marked, in fact in five cases there was an increase in size and the author thinks this may be a direct result of the action of the antimony on the liver, for CUSHNY (1915) has shown that this organ stores it up for some time

As regards the blood there is rapid improvement in the haemoglobin and erythrocyte content while the total leucocyte count gives high readings. There seems to be clear evidence that leucocytosis is part of the patient's reaction to tartar emetic. Differential leucocyte counts seem to show that the increase is due largely to the coarsely granular eosinophiles.

There is apparently nothing characteristic in the urine of kala azar patients.

Of the failures in treatment two of the cases are dealt with briefly. One of these was hopeless from the commencement. The injections were badly tolerated, there was recurrent diarrhoea and persistent fever. The patient finally died from asthenia on the 87th day of treatment, when his weight was only 63 lb.

Another had dysentery on arrival and as it was thought that the injections might have been harmful in the preceding case they were discontinued. The disease was of the fulminating type with enormous liver and spleen. Broncho-pneumonia set in with cancrum oris and the patient died on the 49th day.

Another of the fatal cases at first seemed to answer admirably to the injections, although each was followed by a sharp attack of coughing vomiting never occurred. Fourteen intravenous injections had been given, the last four doses being 9, 9, 9, and $9\frac{1}{2}$ cc of a 2 per cent solution, and these had been taken without much trouble. Fever had been absent for 14 days and the case was thought to be progressing favourably. On the morning of July 15, 10 cc was given. Twenty-four hours later fever recurred and pleural fremitus became evident over the right lung. The pulse became weak, irregular and intermittent and the patient died in a state of collapse on the 19th. At the post-mortem adhesions were found around the spleen, stomach, diaphragm and small omentum while the lungs were everywhere adherent to the thoracic wall. There was a patch of consolidation in the right lung. Leishman-Donovan bodies were not found nor did cultures on NNN medium yield any positive result.

The course of the fourth fatal case was a similar one, in which progress towards recovery was suddenly arrested and a condition of heart failure supervened. There was no post-mortem examination.

The cause of death in the two cases just mentioned is discussed by the author. He mentions the fact that four other cases of death following on injections of tartar emetic have come to his notice. In one of these a sudden increase of dose from 4 cc to 7 cc of the 2 per cent solution was followed by death in a few hours. Though GREIG (1917) has shown that the relatively healthy sepoy with oriental sore will tolerate daily injections of 7 to 10 cc of a one per cent solution, it is far otherwise with the emaciated patients who suffer from kala azar. The author quotes from CUSHNY (1915) on the action of the K ion on the heart and the cumulative effect of antimony, which passes into the tissues much more gradually than arsenic. It is possible that this cumulation may play some part in the splendid efficacy of the drug as a cure for kala azar. Knowles thinks that

the first of the two cases died of pneumonia while cumulative antimony poisoning may fit the symptoms of the second

In the summary the author advises the use of a one per cent solution rather than a two per cent. For an adult a course of 18 to 20 injections, commencing at 1 cc and rising to 12 cc, is the custom at Shillong. Two clear days should be allowed between the injections. Towards the end of treatment the dose should not be pushed and the intervals should be lengthened. A two gramme course distributed over three months seems to be sufficient treatment for an adult. Albuminuria is not a contra-indication to intravenous tartar emetic but it is a signal to go slowly. The state of the heart is best watched by the force and regularity of the pulse. The sudden reappearance of oedema may be a danger signal. In addition to the antimony treatment the patient's health must be built up in every way by good food, the removal of any helminthic infection and the administration of tonics. In the latter it is best to avoid arsenic.

The author finally discusses the question of transmission of kala azar. The bed-bug and the ankylostome are considered in this respect. If the bed-bug is the carrier then some further development in the bug, possibly an infection of the next generation through the ovary, must be postulated. So far there is no evidence of this nor of the possible infection of ankylostome larvae, hundreds of which were examined after hatching from eggs obtained from kala azar cases.

C M Wenvon

KUNDU (Saratsasi) **Further Observations on Kala Azar**—*Ind Med Gaz* 1920 Feb Vol 55 No 2 pp 53-57

The author writes that the popularity of intravenous tartar emetic treatment for kala azar is increasing daily. At the time of writing 45 cases were attending as out-patients and 16 were in-patients. The drawback to the work was that as soon as improvement had taken place the patients ceased to attend, but this irregularity was ceasing owing to the recurrence of the disease in those who have interrupted their attendance. The treatment requires 18-25 injections over a period of 2 to 3 months.

Emphasis is laid on the importance of recognizing the disease. One must not expect in all cases to find the typical picture. The clinical features vary with the stage and nothing can be set down as a characteristic type.

In the initial stage there is only fever, which does not as a rule react to quinine. In the intermediate stage there is fever with weakness and emaciation. The liver and spleen may not be enlarged. Cases like this were treated as out-patients. As the disease becomes chronic there may still be hardly any enlargement of the spleen, none of the liver and not even much anaemia unless there is a concurrent ankylostome infection. Some show irregular fever and marked anaemia with no enlargement of any organ. Others again have diarrhoea or dysentery with little splenomegaly. The worst cases show the profound anaemia and emaciation with large liver and spleen and it may be with dysentery, bronchitis, pneumonia, cancerum

oris, epistaxis, otitis media, general oedema or ascites. Cardiac irritability is a marked clinical feature in all kala azar cases and needs careful watching during treatment. An accident happened to a patient near recovery, due to sudden heart failure after a large dose.

Pigmentation of the skin, ungratified appetite, dryness and roughness of the body surface and thinning of the scalp hairs are noticed in some advanced cases. The author notes that some regard oedema as a sign of approaching death. In his experience it generally disappears after a few injections supplemented by tonics. Oedema appearing during the course of treatment is a signal for care. Two cases of ascites with fever and enlarged liver and spleen were treated successfully by repeated tappings and tartar emetic intravenously.

Diagnosis must be established by the finding of the parasite. It is difficult to find in the blood and spleen puncture cannot be performed in those cases where there is no enlargement of the organ. There is no peculiarity of the disease in the early stages except the fever and this can only be recognized as resulting probably from kala azar by its refusal to react to quinine. The double daily rise in temperature is a rarity. So many types of fever occur—irregular, intermittent, remittent, continued, rheumatic, associated with rigor, typhoid—that without the finding of the parasite it is rash to pronounce a case as one of kala azar. Yet without such diagnosis, when there is resistance to quinine by mouth and injection and other symptoms correspond with kala azar, it may be necessary to treat the cases. Many such have been treated as out-patients at Nowgong and have been completely cured.

In the author's hands spleen puncture has been followed by no fatality and he considers it an operation of small risk and a justifiable procedure for positive diagnosis. The parasites obtained vary considerably in shape and size, sometimes being round and as large as a red blood corpuscle.

The possible modes of infection are discussed. At Nowgong kala azar is most common among the natives of the place. It is rare among the Bengalees and Keyas. There is a marked difference in the diet of these two groups. The latter are strict vegetarians and the principal substance of their diet is "ghee". The native Assamese feed largely on fish and the author suggests the probability of fish-infection.

At Nowgong house infection is not a marked feature of the distribution of the disease, whereas in a newly notified area where the disease is epidemic family infection is quite common. Dr Dodds PRICE sent a family of six to the hospital. The father aged 45, the wife 35, and the eldest girl 14 were infected but the three younger children (7, 4 and 2) were in perfect health.

The patients generally take the injections sitting on a bench. The author does not find it necessary to keep them in bed. Many cases walked to the hospital three or four miles, received their injection and then returned home.

Sometimes accidents occur towards the end of treatment. In two cases death occurred suddenly with a fit of epileptic nature when they were apparently well. In another case, which was improving, a feeling of constriction in the chest was complained of just after a large injection, the heart became irritable and painful and the patient died soon after.

As the stage of cure is approached coughing and vomiting after injection are more common. It appears that the drug is cumulative in its action.

As regards the test of cure the author points out that some physicians rely on the absence of fever for a considerable time. At Nowgong the practice is to watch the patient for a fortnight without treatment and if no signs of continued infection are present the patient is again started on the injections in moderate dose. If there has been no reaction to the antimony tartrate after two or three injections it is assumed that parasites no longer exist in the body. The peripheral blood shows marked leucocyte increase at the time of cure.

A case of kala azar in a boy of ten is described. After 12 injections the spleen was still large and fever continued. An attack of double pneumonia occurred. The patient recovered from this complication which at the same time had rid him of his kala azar. The virulent infection associated with the pneumonia had apparently killed off all the leishmania.

[No mention of the dose of tartar emetic is made. Presumably the author is using the usual 1 per cent solution of which 4-6 cc is spoken of as a moderate dose. The paper is rather involved and many of the points brought out seem to be a repetition of those emphasized in KNOWLES' paper reviewed above.]

C M W

1. LOW (George C) **Kala Azar in Mesopotamia** [Correspondence] —*Brit Med J* 1919 July 26 pp 115-116
11. — **Kala Azar in Mesopotamia and Its Incubation Period** [Correspondence] —*Ibid* Dec 6 pp 758-759
111. SPRAWSON (C A) **Kala Azar in Mesopotamia and its Incubation Period** *Ibid* Nov 22 pp 667-669

i & 11 These letters deal with the question of the endemicity of kala azar in Mesopotamia in connection with a previous paper by the author, two letters concerning it by Dr HAMILL and Colonel LEDINGHAM [this *Bulletin*, Vol 14, pp 202-203] and an article by Lt-Col SPRAWSON (iii below). They are purely controversial in character.

iii In this contribution the same question is discussed. The author cites five cases of the disease in Mesopotamia in patients who had left India more than 16 months previously. He, however, agrees with Colonel LEDINGHAM in considering that evidence is lacking as to the indigenous existence of kala azar in Mesopotamia*.

E J Wyler

NICOLLE (Ch) **Chronique du Kala Azar en Tunisie pendant l'année 1918. Kala Azar humain** —*Arch Inst Pasteur de Tunis* 1919 June Vol 11 No 1 pp 41-45

Four further cases of infantile kala azar have been diagnosed by spleen puncture in Tunis during the period Sept 1917-Sept 1918, bringing the total up to 54 since Sept 1907.

* See KULZ, this *Bulletin*, Vol 15, p 281.

The four additional cases were in Italian children. In three the disease was complicated by purpuric rashes. Three of the patients were treated with iodide of emetine and bismuth 5 centigrammes daily. The treatment was in no case sufficiently prolonged to enable a judgment to be formed of its efficacy.

E J W

DA MATTA (Alfredo) **Notas para a Historia das Leishmanioses da pelle e das mucosas** [Notes on the History of Leishmaniasis of the Skin and Mucous Membranes]—*Amazonas Medico* 1918 Vol 1 No 2 pp 11-17

The author states that research concerning leishmaniasis of the integuments in S America proves its existence in parts of that continent from remote times. Peru would seem to be the country in which the disease was first clinically reported. In 1759 CHAUVAGE and CHARLUS named it *Framboesia tropica* and *Papilloma tropicum* and in a work by TELLO "Antiquity of syphilis in Peru" (? 1826), the following passage is quoted from an account of a journey into the interior published by Fray FAYAS Y QUIROS in 1826 "In all these regions it is common to see lepers and persons with their noses eaten away. Mosquitoes and other insects are, if precautions are not taken, an important cause of deep and fetid ulcers of legs and arms, foetor of the mouth." Again TELLO speaks of "the sores caused by the bites of mosquitoes which cause mutilating ulcers of the face." The clinical features of tegumental leishmaniasis are clearly recognizable in this passage, which, though it gives the first clear picture in writing, is confirmatory of actual pictures on pottery of the Incas, which prove that leishmaniasis existed here at periods anterior to the conquest of S America. Gallico, Uta, Kjapa, Tiac-araña, Jaccuya, Quecpo, Llaga, Espundia are some of the names given to the disease in different parts of S America. The disease was for some time regarded as a form of lupus, as is shewn by an article in "La Cronica Medica" (Lima) in 1888, bearing the following title, "Etiologia, topographia e tratamiento de la Uta (lupus) en el Peru." In 1859, however, Dr L VILLAR wrote in the "Gaceta Medica" of Lima "The disease is very like the Aleppo button." In 1911 ESCOMEL maintained in a paper read before the Medical Society of Arequipa, that the "Espundia" of Peru and Bolivia is identical with leishmaniasis, a finding confirmed by LAVERAN and NATAN-LARRIER on examination of ESCOMEL's preparations (1912). In the same year WENYON published an account of a case of leishmaniasis in a naval officer who had travelled in Peru and Bolivia. The *Leishmania* found possessed all the characters of those taken from ulcers in Bagdad.

F S Arnold

TYZZER (Ernest Edward) & WALKER (Ernest Linwood) **A Comparative Study of *Leishmania infantum* of Infante Kala Azar and *Leptomonas (Herpetomonas) ctenocephali* parasitic in the Gut of the Dog Flea**—*Jl Med Research* 1919 July Vol 40 No 2 pp 129-176 With 3 plates

This is a long paper describing investigations undertaken to determine if possible the generic and specific relationship of the two organisms.

by a comparative morphological study supplemented by observations on the behaviour of cultures under various temperature conditions and by the results of animal inoculations. The authors commence their paper by a concise critical account of the work that has been done on the subject by others. In the course of this account they point out that

"none of the many flagellates discovered in insects has been shown to be identical with leishmania, so that there is at present no known source or reservoir for the latter parasite except the mammalian body. It is difficult to account for the transmission of leishmaniasis except through the agency of an invertebrate host but the alternation of invertebrate and vertebrate hosts has not been demonstrated either by morphological observation or by experimental attempts to transmit the disease through the agency of insects. The problems concerning the natural transmission of either human or canine leishmaniasis thus remain to a large extent unsolved."

The material used in the experiments described was obtained, in the case of *L. infantum* from a case of infantile kala azar in a Greek child in Massachusetts, in the case of *Leptomonas (Herpetomonas) ctenocephali* from fleas collected from dogs in San Francisco and Boston.

A comparative study of the morphology of the organisms was carried out under, as nearly as possible, parallel conditions and is described in minute detail which cannot here be summarized. It is also clearly set out in tabular form. A marked difference was noted in the ability of the two flagellates to withstand low temperatures, leishmania proving to be very much more susceptible. Thus at temperatures ranging between 12° and 21°C, *L. infantum* quickly died out, whilst *Leptomonas ctenocephali* was found to grow vigorously. When the flagellates were incubated at body temperature *L. infantum* was conspicuously longer lived than *Leptomonas ctenocephali*. It is considered that the changes in the NNN medium which occur at body temperature, rather than the temperature itself, eventually checked the growth of leishmania cultures. *Leptomonas ctenocephali* cultures on the other hand were destroyed before the medium became visibly affected.

"Inability to thrive at low temperatures may explain the more limited geographical distribution of *L. infantum* as compared with *Leptomonas ctenocephali*. The occurrence of leishmaniasis however, in regions where the temperature falls far below that necessary for the growth of the parasite in culture may be accounted for by the natural occurrence of the parasite in certain warm blooded animals which serve to maintain it during the colder seasons."

Inoculation experiments are described and over eighty are set out in a table. Using cultures of *Leptomonas ctenocephali* the authors failed to produce leishmaniasis by subcutaneous inoculation in a monkey and two mice or by intra-peritoneal inoculation in eleven mice or by intravenous inoculation in ten mice. Feeding experiments in two mice were also negative.

Feeding of leishmania cultures were negative in a series of fourteen mice and in a monkey.

"Generalized infections have followed the intravenous and intra-peritoneal inoculation of mice and the intravisceral and intra-peritoneal inoculation of dogs with cultures of *L. infantum*."

The authors conclude from their investigations that the assumption that the organisms are identical can be definitely excluded. "The differences noted with respect to morphology, resistance to various

temperatures and ability to multiply in the mammalian body as well as geographical distribution are such that it would appear preferable to consider the organisms as two species rather than varieties of the same species "

E J W

- 1 CHATTON (Edouard) Sur la culture pure d'un *Leptomonas* de la puce du chien et sur un caractère de ses formes culturelles qui les distinguent de celles du Kala Azar de souches humaine et canine — *Bull Soc Path Exot* 1919 June 11 Vol 12 No 6 pp 313-316
- 11 CHATTON (Edouard) & BLANC (Georges) Inoculations positives de cultures de *Leishmania tropica* aux Geckos *Ibid* pp 316-321

1 While making experiments in connection with kala azar, the fleas (*Ctenocephalus serraticeps* var *canis*) harboured by a certain dog were found to be infected with a *Leptomonas* to the extent of 75 per cent The infection was confined to the rectum Experiments were made to ascertain whether this flagellate could be identified with or distinguished from that of kala azar Cultures made from the dog's bone marrow and blood were negative

Thirty of the fleas were crushed and injections were made into the peritoneal cavity of two mice The blood of the mice was cultivated on NNN medium 8 and 33 days after inoculation, with negative result, and post-mortem examination failed to reveal any signs of infection

The flagellates were obtained in pure culture from fleas on NNN medium These cultures at first sight appeared identical with leishmania cultures but were distinguished from them by containing large forms with ribbon-like slender body, spirally twisted and exactly resembling *Leptomonas davidi* These spiral forms are never found in cultures of *L infantum* or *L tropica* The author has never encountered them in cultures of canine kala azar obtained from two dogs and lays stress on this in view of PATTON's suggestion that canine kala azar is distinct from the human variety and that *Leptomonas ctenocephali* is the infecting agent

11 In Southern Tunis the authors cultivated a leptomonas from the blood and organs of geckos (*Tarentola Mauritanica*) in 37.5 per cent but the blood examination of 900 of these animals from the same region failed to reveal the presence of leptomonas or leishmaniform bodies About 600 of these geckos were examined at least twice, 223 of them were dissected but with negative result Examination of the blood and organs of the geckos from which flagellates were cultivated was also negative Finally, in geckos intra-peritoneally inoculated with leptomonas cultures, the flagellates were found intact or phagocytized in the peritoneal fluid at the end of 48 hours but were never found in the blood It is concluded that geckos have an occult form of infection which can only be recognized by culture

Experiments were made to ascertain whether geckos were capable of harbouring the parasite of Oriental Sore For this purpose the lizards were obtained from Northern Tunis as natural infection with leptomonas in this region is very rare (cultures from 54 animals were negative)

Out of 16 geckos inoculated with cultures of *L. tropica* flagellates were grown from three. These possessed the "characters of leishmania." 12 geckos from Northern Tunis were inoculated with leptomonas cultures. Culture of the blood of these animals was successful in one instance only.

On the view that atmospheric temperature may influence the susceptibility to infection, 4 animals were kept at 22-23° and intra-peritoneally inoculated with cultures of *L. tropica*. Leishmania were successfully grown from 3 out of the 4 from blood taken on the 12th day after inoculation. A parallel experiment with leptomonas was successful in only 1 out of the 4 animals.

Geckos develop no signs or symptoms of infection with leptomonas whether natural or artificial. Neither does infection with leishmania reveal itself in any way, whilst direct examination of the blood and organs is negative with respect to both flagellates. The presence of the parasites can only be demonstrated by culture.

It was not possible to produce an Oriental Sore in man or monkeys with leishmania from geckos.

The passage of *L. tropica* through geckos does not modify the characters which distinguished it in culture from the leptomonads which naturally infect them.

E J W

PARROT (L.) Trois observations de Bouton d'Orient avec des reflexions sur les circonstances de la contamination — *Bull Soc Path Exot* 1919 Nov Vol 12 No 9 pp 607-611

Three cases of Oriental Sore are described in which the circumstances of infection suggest that lizards were the reservoir whilst sandflies were the carriers of the disease. A medical man brought eight female sandflies (*Phlebotomus perniciosus*) in a cage containing six lizards (*Tarentola mauritanica*) to his home in a region where oriental sore is unknown. The flies were caught in this region, the lizards at El-Kantara where the disease is endemic. A few days later it was found that the flies had escaped from the cage which had been kept in the house. About three months later the doctor, his wife and son developed Oriental Sore (L D bodies found).

It is possible that the doctor may have acquired his infection during frequent visits to an endemic zone. His wife and son on the other hand, had not been in an endemic zone since more than one and three and a half years respectively.

The possibility of direct contagion is negatived by the fact that the lady developed a lesion at a date anterior to the ulceration of her husband's sore. Further, the son left home a month before the development of any lesion in his parents.

No cases of Oriental Sore were found among the local population.

E J W

PATTON (W S.) Note on the Etology of Oriental Sore in Mesopotamia — *Bull Soc Path Exot* 1919 Oct 8 Vol 12 No 8 pp 500-504

This article, which is confined to general observations, refers to a communication made to the Royal Physical Society of Edinburgh on the same subject on March 24, 1919.

"All observations made by the writer pointed to the parasite of Oriental Sore being acquired by rubbing into the skin *Herpetomonas phlebotomi* at the time an infected sandfly is crushed when biting, and this is a very frequent occurrence on all exposed surfaces"

It is suggested that the experiment of rubbing an infected hind-gut into the skin at a marked spot might throw light on the method of infection, whilst the question of the gecko as natural reservoir of the parasite of Oriental Sore might be elucidated by noting whether the specimen has or has not ingested the blood of one of these lizards

E J W

HEUYER (G) & CORNET (I) Un cas de leishmaniose cutanée (*Leishmania furunculosa*) observe dans les Balkans—*Paris Méd* 1919
May 10 Vol 9 No 19 pp 385-387 With 3 figs

The description of a case of Oriental Sore (LD bodies found) which occurred in Albania. The patient was a Russian soldier. It is not stated whether he had ever been to a region where the disease is known to be endemic

E J W

BONNE (E) A Few Notes on "Bosch-Yaws," the Dermal Leishmaniasis of Dutch Guiana.—*Jl Trop Med & Hyg* 1919
July 1 Vol 22 No 13 pp 122-123

The author describes several unusual features of this disease. A lymphatic type is described where a few ulcers on the back of the hand were followed by patches of cutaneous infiltration and subcutaneous nodules along the course of the lymphatics of the arm. The bicipital lymphatic glands were also swollen. In some of these cases leishmania was found in these secondary lesions as well as in the ulcers.

Nasal complications were seen in some cases. These were in the form of crusts with discharge, ulcerating nodules on the septum or even a small tumour-like mass. Parasites were found in these. Never were the serious nasal complications of Espundia of South America encountered.

Two patients were seen each of whom had one leg below the knee nearly covered with verrucous patches, with a thick horny layer in some parts and defects of epithelium in others. The condition had been present for a few years and was called by the natives bosch-yaws. It was certainly not elephantiasis. The disease was contracted in the woods where bosch-yaws is acquired. Though the author could not find leishmania in the lesions he inclines to the view that it is a pseudo-elephantiasis type of the disease. No other parasite was found to account for the condition.

The parasite of bosch-yaws has been cultivated on NNN medium made from guinea-pigs' blood. Cultivation from the peripheral blood was negative. The organism has been grown from the lesions when it was not possible to find it in smears.

The natives of the country believe the disease to be the result of scratching with the thorns of certain plants but no scientific data are available to support this view.

C M W

BERIBERI

SIMPSON (K) A Note on the Environmental Factor in the Causation of Beri-beri—*Lancet* 1919 Dec 6 pp 1027-1028

In his experience in a beriberi hospital at Singapore during 1914-1915 the author found that the Chinese cases were immigrants and not those who lived in the state, coolies from the rubber plantations being especially prone to the disease. Certain areas in Johore and one particular saw mill were apparently endemic centres, and of all trades tailors alone accounted for more than half the cases. No figures are given. The investigations seem to him to indicate that for the production of beriberi, and rickets, something more than food deficiency is required, and that the disease is probably dependent on overcrowding and unhygienic surroundings.

P W Bassett-Smith

SALM (A J) Iets over Atjeh en de Beri-Beri [Achin and Beriberi]—*Geneesk Tijdschr v Nederl-Indie* 1919 Vol 59 No 1 pp 131-148 With 5 plates

A statistical survey of the history of beriberi in Achin, Sumatra, from 1876 to 1914. In 1876 the number of patients coming under treatment for beriberi was 111, in 1877, 750 and in 1878, 1,184. From then until 1896 the number never fell below 1,000, it was generally over 3,000 and in 1886 reached a total of 5,883. In 1896 the number was 3,398 but dropped in 1897 to 468. Since then the largest total has been 701 in 1899. 1906 was the last year with a figure exceeding 100 and the totals for 1912, 1913 and 1914 were 12, 4 and 3 respectively. The author states that there was no change in the rationing of the Achin army which could account for the drop from 3,398 in 1896 to 468 in 1897 and while fully admitting the importance of diet as a factor maintains that "the vitamine theory does not explain everything and there is some other factor at present unknown to us."

F S Arnold

LEGGATE (A R) Observations on Beriberi among the Chinese in France.—*Edin Med J* 1920 Jan Vol 24 No 1 pp 32-36.

The author gives an interesting description of the types, cause, symptoms and treatment of 269 cases of beriberi treated in the Chinese General Hospital, on arrival in France. Both wet and dry types were seen. Though several deaths occurred in the ships there were none in the hospital. He notes that of the 154 wet cases in only 6.5 per cent was the "squatting" test demonstrated, whereas it was present in 66 per cent of the dry cases. In no uncomplicated case was there a rise in temperature. The symptoms and treatment conformed to those generally recognised in text books and the excessive use of polished rice in the dietary was the etiological factor in the production of the disease.

P W B-S.

RIDDELL (J D), SMITH (C H) and IGARAVIDEZ (P G) **Beriberi at U S Army Base Hospital, San Juan, Porto Rico Laboratory Investigations and Clinical Manifestations of Sixty Cases —***Jl Amer Med Assoc* 1919 Feb 22 Vol 72 No 8 pp 569-570

It is noted that these were the first cases of beriberi on record at Porto Rico, the majority of the cases coming from the 373rd Regiment. An investigation showed that the dietary was at fault—an excess of polished rice, deficiency of fresh vegetables and a large amount of canned foods—and all the patients began to improve when placed on a high protein diet. There were 56 cases with two deaths, both from cardiac attacks, which came on within twenty four hours of admittance into hospital.

P W B-S

HESNARD **Les Polynevrites du Beriberi —***Arch Méd et Pharm Nav* 1920 Jan Vol 109 No 1 pp 42-43

After a careful investigation of thirty epidemic cases of beriberi in the hospital at Sidi-Abdallah the author was unable to find any specific characteristic nerve symptoms.

P W B-S

SCALA (Alberto) **Beri-Beri e Malattie per Carezza Parte 2 —***Ann d'Igiene* 1919 May 31 Vol 29 No 5 pp 286-301

The author in his conclusions lays stress upon the following points —

(1) The mineral substances contained in the ration are factors of the greatest importance in the causation of beriberi, and scurvy, whenever they are not perfectly balanced and physiologically complete and are not in the form of a colloid as required for assimilation. The supply to a daily ration for beriberi patients of different mineral substances, alone, in mixture, with or without organic salts, has so far not given appreciable benefit, but it is probable that these methods do not supplement the deficiency in the ration, or reproduce the conditions of a normal food supply.

(2) The continued administration or use of a single food, in which undoubtedly the mineral substances are not complete, brings about a condition of beriberi, which is a form of acidosis, the alkaline phosphates not reaching the central nervous system, or scurvy which is also a form of acidosis aggravated by the fixation of the earthy phosphates.

(3) The protein substances of rice are not the cause of beriberi, just as zein is not the cause of pellagra. The first (vegetable protein) are complete, containing all the amino acids necessary for the synthesis of the animal protein.

These according to SUZUKI, YOSHIMURA & FUJI are —

Glutamic Acid	14.5 per cent
Leucine	14.3 per cent
Alanin	3.7 per cent
Prolin	3.3 per cent
Arginine	1.6 per cent
Phenylalanine	2.0 per cent
Histidine, Lysine & Tyrosine	Small quantities

P. W B-S.

GOTO (M) & TAKAHATA (T) [Nature of Beriberi and Related Diseases]—*Fukuoka Ikwadagaku Zasshi* [Abstract in German] *Med Zeit herausgegeben von "Zasshi"* der Med Fakultät der Kaiserl Univ Fukuoka (Kyushu) Japan 1918 Oct Vol 11 No 4 pp 17

On the basis of feeding experiments conducted on mice, rabbits and hens, the authors concluded that beriberi is caused by cholic acid and its derivatives Further work is in progress

P W B-S

KIMURA (Onari) **Histologische Degenerations- und Regenerationsvorgänge im peripherischen Nervensystem Experimentelle Untersuchungen mit besonderer Berücksichtigung der Regeneration nach nicht-traumatischer Degeneration und mit Berücksichtigung der menschlichen Polyneuritiden** [Histological Degenerative and Regenerative Processes in the Peripheral Nerve System Experimental Research with special Reference to Regeneration after Non-Traumatic Degeneration and to Polyneuritis in Man] *Mitteil a d Pathol Inst d Kais Univ zu Sendai, Japan* 1919 Vol 1 No 1 pp 1-146 With 10 figs & 5 plates

The author, who is well qualified to write, has produced a most valuable monograph upon the nerve changes found in beriberi. He first describes the work done by other pathologists in various countries, and then gives in detail his own work, illustrated by excellent microphotographs and coloured plates. In birds fed solely upon polished rice the pathological changes that take place in the peripheral nerves stand out above all others, but unless the birds are forcibly and regularly fed, starvation phenomena complicate the results. The hypertrophy and dilatation of the heart, he considers, are not constant or essential characters, but in all prolonged experiments the muscle fibres show marked fatty degeneration and the walls of the blood vessels frequently become implicated (DOINIKOW). The microscopical changes seen in most of the organs, as shown by SEGAWA, are of a regressive and degenerative character. The affected skeletal muscles, which in human beriberi are of special importance, showing mainly fatty degeneration or simple atrophy, may rapidly regain their normal capacity for work and the changes may perhaps be regarded not as primarily essential but as secondary phenomena caused by nutritive disturbances and are metabolic in character. In both man and birds restricted feeding on different varieties of foods may produce one or a group of several diseases, beriberi, scurvy, Barlow's disease, Czerny's flour disease, etc. YAMAGIWA has pointed out that as in beriberi, so also in the rice neuritis of birds, the nerve changes are of a *degenerative* character, they are neither an inflammatory nor a purely atrophic phenomenon, though a sharp distinction between these three processes in nervous tissues is not easy to make. In the author's experiments in no case had he any difficulty, and in none was there any change that could be regarded as inflammatory. He states that the beginning of the neuritis was not always limited to the distal branches, as the first trace of degeneration started at a certain height in a nerve fibre, but that this spot may vary even in the same nerve bundle of the same nerve branch. Badly degenerated nerve fibres were found to lie

alongside quite unaffected normal nerve fibres in all the nerves examined. A primary damage in the central nervous system may occur, especially in acute cases. The fact of a left recurrent paralysis with enlargement of the heart, which has been clinically determined in beriberi, is explained by the nerve being exposed to damage in its whole course and the extra pressure by the heart causes degeneration at a relatively high point. PAL holds that multiple neuritis arises from a general disease of the nervous system which produces sites at different spots predisposed to disease, but it is recognised that the nerve fibres do degenerate in the distal parts more than in the higher sections. In early cases, the smallest branches between the muscle fibres, before entering the muscle, in the fascia, in the cutis, and the smallest branches on exit from the larger nerves, are in a higher state of degeneration than those of the large nerve trunks. The lower extremities are usually earlier and frequently more extensively affected than the upper, and the peroneal nerves suffer most.

The first perceptible signs of degeneration appear in the axis cylinders but a peri-axial alteration also exists, the destructive products being absorbed locally. The regenerative processes are found by the side of acute degenerative changes although only in inconsiderable amounts, the complicated pictures (end buds, etc.) quoted by so many authors were rarely observed.

A very good bibliography is appended

P W B-S

SHIMBO (Masuho) Ueber die Nebenniere von Kakke-Leichen — [The Suprarenals in Beriberi]— *Verhandl der Japan Pathol Gesellsch Tokyo* 1918 Apr 2-4 Vol 8 p 194

The author examined the suprarenals in nineteen cases of beriberi, he found hyperaemia and hypertrophy of the cortex without degeneration, the medulla was hypertrophied with marked round celled infiltration round the vessels, and presence of hyaline bodies from degeneration of the cells. The condition is different from ordinary suprarenal hypertrophy. Whether this is a primary or secondary change it is difficult to say, but the author believes it to be the latter as it is not always found.

P W B-S

KAGOSHIMA (Shigeru) Ueber die Veränderung des N opticus bei Beriberi [On the Changes in the Optic nerve in Beriberi] *Verhandl der Japan Pathol Gesellsch Tokyo* 1918 Apr 2-4 Vol 8 pp 190-191

The author examined the eyes of fifty beriberi corpses, many of the cases were also seen before death. Distinct changes in the optic nerve were seen in four cases. Definite areas of local degeneration were found most commonly in the lower temporal quadrant, as a wedge shaped patch with the base directed to the lower lateral portion.

The nature and localization of the change in beriberi is extraordinarily similar to that seen in alcohol and nicotine poisoning, and is probably due to the unknown beriberi toxin. The wedge shaped area of degeneration is well shown in Figure 1 of the plate.

P W B-S

KATO (Shin-ichi) & YAMADA (Shiro) Ueber die Arrhythmie der Herztätigkeit bei Beriberi [Cardiac Arrhythmia in Beriberi]—*Mittel Med Fak Kans Univ Tokyo* 1918 Vol 19 pp 229-244 With 2 plates & 6 figs

Two cases of definite beriberi which previously had shown no evidence of cardiac irregularity were observed. The arrhythmia did not set in until the patients were convalescing and slowing of the pulse was first noticed. The electro-cardiograms showed a condition of sinus-arrhythmia. The authors conclude that as the arrhythmia set in with a slowing of the pulse and disappeared again with the return to normal, it was probable that the tone of the vagus rose (vagotonia). It was noticed that the arrhythmia was absent during the time that the patient was under the influence of atropine. They believe that this sinus-arrhythmia in the convalescent stages of beriberi is not rare.

P W B-S

SALEEBY (N M) The Treatment of Beriberi (Human) with Autolysed Yeast Extract—*Philippine Jl Sci* 1919 Jan Vol 14 No 1 pp 11-12 With 1 plate

The extract of rice polishings is largely used and is most efficient for infantile beriberi, but does not act so well in chronic cases.

WILLIAMS and SALEEBY found that a hydrolysed extract had a more decisive action in these chronic cases, but owing to the poisonous effects of the presence of choline great care has to be taken in its administration. COOPER found that an autolysed yeast was effective with fowls and was free from poisonous effects. Its action was therefore tried in human cases by the authors. Brewers yeast was placed in an incubator at 35° C for about 48 hours to autolyse, this mass was filtered through paper, washed, and the filtrate concentrated under a partial vacuum at a temperature below 60° C to a volume of about one third of the original. About 40 cases were treated, including children, hospital cases and out-patients, adults were given 15-40 cc three times a day, and children 2-4 cc every three hours, no signs of poisoning were observed. Marked results were noticed in less than three days and a week's treatment seemed to give full relief in mild acute cases. Infantile beriberi symptoms were relieved with comparative rapidity even when the child continued to be suckled by the mother. Finally it is stated that the effect of the autolysed yeast extract used was similar to that produced by the hydrolysed extract of rice polishings, though it seemed somewhat weaker.

P W B-S

FUNK (Casimir) Action of Substances influencing the Carbohydrate Metabolism in Experimental Beriberi—*Jl of Physiology* 1919 Dec Vol 53 No 3-4 pp 247-256

The author summarises the investigations which have been made on the physiology of the anti-beriberi vitamine and notes that the fat content in the blood of beriberi cases is below normal and that according to ULMANN vitamin B acts as tonus regulators throughout the whole body, stimulating the secretions of saliva, gastric juice,

bile, and pancreatic juice, the action being apparently exerted through the para-sympathetic terminals. He criticizes the experiments made by VEDDER which are inconclusive, with regard to the rôle of vitamine in carbohydrate metabolism [see this *Bulletin*, Vol 12, p 366].

In the experiments now recorded substances known to influence carbohydrate metabolism were tried on normal pigeons and pigeons fed on polished rice. These were glucose, adrenalin, pituitrin, thyroid and para-thyroid glands. These were usually injected, and the effect on the blood sugar, glycogen in the liver and the blood amino-nitrogen investigated. He found in every experiment that the figures for the sugar in the blood were on an average higher on polished rice than on normal food. Phlorizin did not influence the glycogen content in the liver very much. There was no marked hyperglycaemia in pigeons after administration of adrenalin, such as FLEMING found in ducks, in his experiments he had an increase on rice diet and a decrease on normal diet. Pituitrin was found to have no effect on the carbohydrate metabolism.

The influence of the same substances was studied in relation to the time of the beriberi onset, death and loss of weight. From these it would seem that phlorizin hastened the onset of beriberi with an increased loss of weight. Pigeons on adrenalin lived a shorter time. Pituitrin was found to be without effect. Thyroid gland had a very characteristic action, out of six birds only one developed typical symptoms, the others died so early that the symptoms could not develop. Four out of six on parathyroid developed beriberi but death occurred at the same time as in the controls.

Amongst the interesting data obtained was the action of glucose, which produced practically a disappearance of glycogen and a diminution of blood sugar both in controls on normal diet and on rice. Phlorizin increased the glycogen and sugar in the controls, decreased the glycogen and slightly increased the sugar in the rice series.

The action of thyroid and para-thyroid gland was entirely different as stated above. These experiments confirmed the results of Funk and SCHONBORN on the hyperglycaemia of pigeons on vitamine free diet.

P W B-S

LUMIÈRE (Auguste) Sur les Accidents Polynevrétiques et Cérébelleux chez le Pigeon soumis au régime du riz décortiqué — *Bull Acad Méd* 1920 Jan 27 Vol 83 No 4 pp 96-101

The author states that though his experiments with birds gave results confirmatory of those of WEILL and MOURIQUAND certain peculiarities were observed. The variability of the nervous symptoms in particular was marked. In some cases the bird may show an increased activity or even a state of excitement, in a third of the whole paralytic symptoms appear with or without inco-ordination, contractions and convulsions. Often when the pigeons were on an exclusive polished rice diet they showed no polyneuritis; others markedly affected recover without treatment, but generally cases rapidly clear up when supplied with minute quantities of anti-neuritic substances.

He asks, why is this? And how is it that a diet of polished rice does not affect monkeys in the same way? The neuritic symptoms are thus seen to be very variable, is there any other symptom more constant? He points out that in pigeons his experiments showed marked gastro-intestinal changes causing loss of appetite, with a green diarrhoea, the flora of the stools was scanty but *Bac coli comm* was abundant, injections of the cultures or toxins from these were not pathogenic to nine pigeons. He found that under fed pigeons when on a diet rich in vitamins suffered from the typical symptoms which are therefore due to inanition, not to deficiency of vitamins. *Under-alimentation and absorption* produce a lowering of temperature and a cachexia, followed by the appearance of the cerebellar symptoms, etc, in pigeons. His experiments showed (1) that the brain of an affected bird examined immediately after death appears pale and devoid of blood, (2) That nitrite of amyl inhalations often caused a temporary cure of the symptoms, (3) Occasionally in the pre-agony period in pigeons on a deficient diet rich in vitamins, cerebellar symptoms occurred like those seen in pigeons fed on polished rice, though paralytic signs were less common. Forcibly over-fed pigeons often showed the same intestinal symptoms, they could neither digest or absorb the food and the nerve signs came on as in other cases, death followed in spite of the administration of vitamins. He therefore concludes that the deficiency of vitamins as a theory for the causation of beriberi is susceptible of some revision.

P W B-S

DUTCHER (R Adams) **Vitamine Studies IV Antineuritic Properties of Certain Physiological Stimulants—*Jl Biolog Chem***
1919 Aug Vol 29 No 1 pp 63-68

The author carried out some preliminary experiments to find, eventually, chemical substances whose physiological action and chemical constitution have been studied, which will bring about physiological responses similar to those of vitamine extracts. These were thyroxin, desiccated thyroid gland, pilocarpine hydrochloride and tethelin. Pigeons were used and a basic diet of polished rice, or washed polished rice plus 3 grams of purified casein to each 100 grams of dry rice. The pigeons became polyneuritic, with two exceptions, earlier on the casein rice diet than those on the polished rice diet, many of the birds on the former died from starvation. The drugs apparently produced definite relief in certain acute cases of polyneuritis, but the response was never so rapid as when vitamine preparations were used probably because the chemical substances did not contain phosphorus, sulphur, and other organic compounds required for repair and building of tissues.

Very emaciated birds responded slowly, if at all, to the chemicals, while less emaciated birds reacted much more quickly, suggesting that the tissues contained a reserve supply of nutriment sufficient for immediate anabolic processes following the stimulating action of the substances employed.

P W B-S

SUEYASU (Yoshiwo) Ueber experimentelle Erzeugung eines der Kakkekrankheit ähnlichen Leidens bei Vögeln, unter Ausschluss der Fütterung mit geschältem Reis [Experimental Production of a Disease Similar to Beriberi in Birds without feeding them on Polished Rice]—*Verhandl der Japan Path Gesellsch Tokyo* 1918 Apr 2-4 Vol 8 pp 118-119

The birds were fed on unpolished rice and cabbage, in more than 50 per cent the characteristic paralysis occurred. In 21 out of 36 fowls, paralysis of the legs was seen in from 11-44 days, in ducks it was evident in from 4-20 days and in both it was identical with that produced by polished rice. Death occurred in 4-7 days from the commencement of the sickness and during the experiment the appetite of the birds did not appear to fall. After death atrophic degeneration of the peripheral nerves and muscles was found. The author attributes the sickness to an excess of micro-organisms in the food.

P W B S

KAWAKAMI (D) [Beriberi produced Experimentally in Goats]—*Chuo Igakkai Zasshi (Jl Central Med Assoc)* 1918 March 20 No 274 p 1224 [From *Jl of the Kamanoto Med Assoc*]

[From Review by R G MILLS]

The author fed five goats on polished rice and in two of them observed paralyse of the limbs, and general weakness progressing to death. The other three showed only general weakness, which in some ended fatally and in the rest recovery followed the resumption of a normal diet. The lesions were the same as those reported in other animal experiments.

P W B-S

MIDORIKAWA (Ko) Experimentelle Untersuchung ueber den Adrenalinhalt der Nebenniere, nebst Bemerkung ueber die Ursache der Adrenalinvermehrung in der Letzteren bei Beri-beri Kranken [An Investigation of the Cause of the Increase of Adrenalin in Cases of Beriberi]—*Verhandl der Japan Path Gesellsch Tokyo* 1918 Apr 2-4 Vol 8 pp 192-193

Though there is in acute and infantile beriberi an hypertrophy of the glands and an increase of adrenalin, the blood pressure is not increased but is often lowered. Experiments were carried out to determine whether in beriberi there was anything that first lowers the blood pressure, and is followed by a compensatory increase of adrenalin production. Male rabbits were used, the animals were injected with a 50 per cent sodium nitrite solution to reduce the blood pressure and the amount of adrenalin was determined by the Ingier-Schmorl process. In control animals the suprarenals averaged 0.523 gm, adrenalin 1.247 dgm. If the animals lived for 3-4 weeks with repeated injections of the nitrite solution in a condition of reduced blood pressure, then the suprarenals showed an important increase of adrenalin and the weight of the bodies was also increased. If death occurred after a short period following the injection of relatively larger doses, the adrenalin is less than normal and the glands are smaller.

In the first the increased adrenalin must be attributed to the compensating hyperfunction of the suprarenals. In beriberi the increase of blood pressure cannot usually be proved, although the hypertrophy and hyperfunction of the suprarenals is very marked but we are still ignorant as to what is the cause of this

P W B-S.

McCARRISON (Robert) *The Genesis of Oedema in Beriberi*—*Proc Roy Soc* 1920 Jan 1 Series B Vol 91 No B636. pp 103-110 With 1 text-fig

The author has already shown that (1) In avian beriberi oedema was constantly associated with massive enlargement of the adrenal glands, (2) 82 per cent of the cases having such enlargement of the adrenal glands presented oedema in some form, (3) The enlargement of the adrenals was associated with a corresponding increase in the adrenalin content as determined by physiological means. In this series of experiments he gives chemical evidence of this increase in the adrenalin content, and they fully substantiate the former observations, and show that the enlargement of the adrenal glands is a true hypertrophy as far as the medulla is concerned. In wet beriberi the adrenalin content was slightly less per gram of gland than that found in dry beriberi or in health, nevertheless in 100 per cent of wet beriberi the total greatly exceeds that found in health, and in 83 per cent it is also in excess of that found in dry beriberi.

The conclusions arrived at are—(1) Deficiency of certain accessory food factors gives rise to a greatly increased production of adrenalin, (2) The excessive production of adrenalin under conditions of vitaminic deficiency is concerned with the causation of oedema found in this order of cases. It must be taken into consideration as a possible factor in the causation of oedema in general.

P W B-S

DE LANGEN (C D) & SCHUT (H) *Over het vet- en lipoidgehalte van het bloed in de tropen, en haar beteekenis bij beri-beri*—*About the Quantity of Fat and Lipoids in the Blood, and their Importance in Beriberi in the Tropics*.—*Med Geneesk Lab Weltevreden* 1919 3rd series A No 2-3 pp 44-67 [In Dutch and English]

The authors commence by stating that up to the present, not only in the tropics but also in Europe, very little is known about the fats present in blood. During digestion a physiological lipaemia occurs and in chronic alcoholism, acute poisoning by phosphorus, and in severe diabetics it is found pathologically. When in quantity it is recognisable to the naked eye. Besides this finely emulsified fat a certain quantity is always present in quite clear serum which is either in a colloidal form or is invisible. To this "fatcore" proper, the investigations here made were restricted. These are the different lipoids as distinct from the neutral fats. The works of BANG & OVERTON are referred to. The lipoids not only coat the cells but are also found intracellularly, and are probably of great importance to cell life and function.

The authors wished to investigate, (1), the total quantity of fat in the blood in the tropics (2), the quantitative relationship of fat and fatty substances (lipoids), (3), how these relations are changed by various diseases. In this paper the total quantity of fat in the blood alone is treated.

A full description of the method, a modification of that used by BANG is given and many tables of the results of the examination of normal and abnormal blood taken in the tropics are inserted. These abnormal conditions include malaria, beriberi and ankylostomiasis. The normal amount varies from 1.5 to 2 per cent, that of natives being somewhat lower than Europeans, two-thirds of the blood fat is cholesterol. In fever free malarial cases and tuberculosis cases the fat approaches the high limit, but in beriberi (7 cases) it was proved to be low, sometimes only one-third of the normal, therefore in beriberi the amount of lipoids is less than normal.

The colouring of serum is due to bilirubine and a lipochrome, "luteine", the later is of an intense yellow colour and can be crystallised out, when this substance is largely increased a peculiar colour of the skin is seen as in diabetes and ankylostomiasis. In beriberi the luteine is generally below the average quantity. The rather important fact is emphasised that luteine is found in vegetable foodstuffs which have a high anti-beriberi value, as peas, beans. Soya beans contain the greatest quantity of these lipochromes, which gradually disappear when the beans are dried or after sprouting, it probably takes some part in the germination of the seed.

P W B-S

MURATA (Miyakichi), KUMAGAE (Kensaburo) & NAKAMURA (Asakichi)
 Ueber die Beri-beri-ähnliche Krankheit beim Meerschweinchen
 [A Beriberi-like Disease in Guinea-Pigs]—*Verhandl. der Japan*
Pathol. Gesellsch. Tokyo 1918 Apr 2-4 Vol 8 pp 121-122

The author states that the slow onset of degenerative changes in the nerves and muscles of guinea pigs is similar to that which takes place in human beriberi, and undoubtedly the sickness of the animals very closely resembles that of man. The nerve and muscle degenerative signs in guinea-pigs were always associated with symptoms of scurvy and both conditions must be attributed to want of fresh food and vegetables with their vitamins, the food used being Okara.

He states that the disease in guinea-pigs is identical with ship beriberi.

P W B-S

SUGA (T) Ueber den Blutzucker der Beriberikranken [The Blood
 Sugar of Beriberi Patients]—*Kyoto Igaku Zasshi* 1919 May
 Vol 16 No 5 p 42

In the acute stages of beriberi, particularly in severe cases, the blood-sugar is found to increase by 0.152 per cent. It decreases gradually during convalescence but never falls below the limits of the normal.

P. W. B-S

KIYOSAKI (S) [**Mucor Isolated from Faeces of Beriberi Patients**]—
Nav Med Assoc Bull Tokyo 1919 Oct No 26 p 1
 [Summarised in *Jl Amer Med Assoc* 1920 Feb 21 p 561]

In the examination of the faeces of thirty beriberi patients the author isolated a species of *Mucor* in ten. The organism when injected into frogs, pigeons, guinea-pigs and rats caused toxic effects, which especially in frogs resembled motor paralysis.

P W B-S

SUWA (Mikiwo) [**"Smut" on Rice a Cause for Beriberi (Preliminary Communication)**]—*Igaku Chuo-Zasshi* Tokyo 1915
 Dec No 219 [In Japanese]

[Summary communicated by Dr William R. WATSON]

Mikiwo Suwa of Tokyo has made investigations and experiments to discover the cause of beriberi as the disease occurs in Japan. He has written a detailed pamphlet on the subject from which the following resume is taken—

There is a very common blight which attacks the ears of the rice called "Smut" (*Ustilagmordea oryzae*). It is a fungus which blackens and destroys the grains of rice. The black powder consists of multitudes of spores. These spores become mixed up with the rice grain and contaminate it. A very small quantity of this spore powder makes the grain to some extent poisonous. The grain being eaten as food a very small quantity of the poisonous spore powder is necessarily eaten also. As large quantities of rice are eaten three times a day by the Japanese it is not unlikely that a sufficient dose of the poisonous spore powder is also eaten and produces the symptoms of beriberi.

With the purpose of proving the poisonous character of the fungus "Smut" an infusion was made from a considerable quantity of it. This infusion in various strengths was put by a catheter into the stomach of rabbits or injected under the skin. Twelve separate experiments were made upon rabbits, they were carried out with great care and attention to detail. The conclusion came to from the consideration of the results of the experiments were that the infusion of smut acts as a poison to the rabbit especially attacking the motor and sensory nerves and also the digestive and other functions of the alimentary tract.

It will at once strike anyone reading the above that there is a similarity between "smut" and "ergot" the one occurring on the rice, the other on barley [[?]rye]. "Ergotism" is well known to us all from text book descriptions of the condition. The poison of ergot attacks the peripheral arteries however rather than peripheral nerves.

Dr Suwa would like to hear from any other workers who may have investigated the properties of the poisonous "Smut" on rice.

[The symptoms of beriberi do not indicate a disease produced by eating quantities of infected rice, and as a cause of beriberi the constant association of "Smut" and the disease would have to be proved. The subcutaneous inoculations of smut infusion into rabbits proves little, feeding experiments would have been more satisfactory.]

P W B-S

SCURVY

MESSERSCHMIDT (Th) *Anamnestiche Erhebungen bei Skorbut Kranken* [Anamnestic Inquiries in Scurvy]—*Med Klinik* 1919 Aug 3 Vol 15 No 31 pp 764-767

The author records 31 cases of scurvy which occurred in one Corps during the months of March to August 1917. He states that 90·3 per cent were in a single regiment in which the average age was higher than in the others and also 60 per cent of the cases in this regiment were from one battalion. The general conditions for the whole corps were the same. In the battalion that suffered most, the cases were most numerous in the companies that obtained least "supplementary" foods and fresh meat. After green stuff was supplied scurvy cases ceased although conditions of life were otherwise worse. The scales of diet are given, the average daily calories was only 2,616. The supplementary vegetables were difficult to supply owing to the irregularities of the temperature, the food was cooked in open boilers at 98° C. He concludes that his impression was that besides the supply of food other, unknown, conditions govern the incidence of scurvy. The total number of cases was too small relatively to the number that remained healthy under the same conditions (0·06 per cent in six months).

P W Bassett-Smith

ABELS (Hans) *Ueber die Rolle der Infekte beim Skorbut der Kinder und Sauglinge (Moller-Barlowsche Krankheit)* [The Part played by Infection in Scurvy in Children and Sucklings]—*Med Klinik* 1919 Oct 26 Vol 15 No 13 pp 1084-1086

The conditions in Barlow's disease and scurvy are discussed. The author doubts whether it is possible to sharply define scurvy. The multiplicity of observations on growing people and those under war conditions point to the many possibilities of infection to which the organism is exposed, under states in which a partial deficiency of vitamins is found. There is clinically a marked contrast between the scurvy of prisoners and seamen and that of young children, war scurvy being often associated with infection. A condition of "dysergia" rather than anergia is produced which renders the person more subject to infections and gives rise to very varied clinical symptoms.

The author recognises three distinct stages—(1) Preparatory scorbutic, (2) Dysergic scorbutic, so called x stage, (3) A stage of infection which follows the dysergic when conditions are suitable, and is generally rapidly influenced by antiscorbutic measures but is sometimes very refractory.

The author concludes that, if we supply such a "dysergic" case with a diet very rich in vitamins, then the defensive reactions are rendered active, which was not possible in their absence, that is, when these vitamins are deficient the body could not protect itself against secondary infections.

Further experiments on animals are likely to give us much useful information.

P W. B-S

WEILL (E) & DUFOURT (A) [Deficiency Disease in Children]
Arch Méd des Enfants, Paris 1919 Nov Vol 22 No 11
 p 561 [Summarised in *Jl Amer Med Assoc* 1919 Dec 27
 p 1936]

The authors describe nine cases of scurvy which developed in a group of children $2\frac{1}{2}$ to 6 years old recently repatriated from regions occupied by the Germans. These were diagnosed as enteritis and dysentery though gingivitis was extreme and painful. The enteritis had lasted in some of the children for ten months, and fruit and vegetables had been omitted completely as tending to increase the bowel trouble. Weill diagnosed the disease and painted the gums with lemon juice. Improvement was rapid when antiscorbutic diet was given. All the children were completely cured within a month.

P W B-S

SAMMIS (J F) A Case of Scurvy with Cerebral Haemorrhage—
Arch Pediatrics 1919 May Vol 36 No 3 pp 274-276

A case is reported of a negro child aged one year who was taken to the New York Hospital by his foster mother suffering from pulmonary symptoms, Temp 104° . The child's gums were swollen and there were evidences of rickets. Ten days after admission the child became convulsed, then unconscious and died in four hours. Post-mortem examination showed a large haemorrhage between the dura and arachnoid with haemorrhages in the spleen and kidneys. There was also fatty degeneration of the liver. Fluid blood was found in the knee joints with subperiosteal haemorrhage extending up both femora, and destruction of the distal end of the epiphyses of these bones.

P W B-S

WILCOX (W H) The Treatment and Management of Diseases due
 to Deficiency of Diet, Scurvy and Beriberi—*Brit Med Jl* 1920
 Jan 17 pp 73-77 With 1 chart

In this interesting paper the author, who was senior consulting physician to the Mesopotamia Expeditionary Force, gives an account of the outbreak of scurvy and beriberi which occurred among these men, with the measures taken to combat these diseases. He emphasises the importance of a better knowledge of the composition of the dietary necessary to prevent scurvy and beriberi, especially among non-medical officers who are in charge of the organisation of such forces, namely that the food must have the necessary vitamins as well as sufficient calories as estimated by the proteins, carbohydrates, fats, etc. The fact that over eleven thousand cases of scurvy occurred in the last six months of 1916 shows the importance of the subject.

The scurvy was practically limited to the Indian troops who up to 1916 were under the control of the Indian government. The men received a certain sum to buy their own food, a system which is unsatisfactory as they frequently spent only part of the money on food and arrived in Mesopotamia often weak, anaemic, and with pyorrhoea, deficient in reserve power and strongly disposed to scurvy.

The British soldier on the other hand was well fed and strong on arrival and did not suffer from scurvy. At Busorah and Amarah fresh fruit and vegetables were obtainable but beyond these places all had to be supplied by boat and their transport was often impossible so that the supplies were insufficient, especially for those at the front.

Steps were taken in July and October 1916 to improve the ration for the prevention of both scurvy and beriberi and the Indians were particularly cared for with regard to scurvy.

The ration scale for the Indians was —

Potatoes and fresh vegetables	6 oz
Fresh fruit (limes, etc)	2 oz
Fresh meat	6 oz
Tamarind or cocum	2 oz
Limejuice three times a week	$\frac{1}{2}$ oz

but conveying the ration to the troops was difficult.

The fresh meat had an important antiscorbutic value both in prevention and cure. Tamarinds were useful. The ration lime juice was useless but, later fresh lime juice was supplied and was of undoubted value.

Beriberi was practically limited to the British troops and in 1915 over 300 cases occurred. The basis of diet for these at the front was tinned beef, white bread, biscuit, tea and jam, a food deficient in anti-beriberi vitamins. In July 1916 oatmeal and dhal were added and in October 1916 $\frac{1}{4}$ oz of marmite (an extract of yeast known to act as a prophylactic against beriberi) was given three times a week, this kept well and no difficulty was experienced in its issue as a ration to the troops. In 1917 atta was mixed with flour for making bread and was an important factor in the reduction of the beriberi cases.

The following table shows the amount of scurvy in the Indian troops and beriberi in the British —

Year	Scurvy Indian	Beriberi British
1916 July 1-Dec 31	11,445	104
1917	2,199	84
1918	825	51

The maximum incidence of scurvy cases in 1917 and 1918 was in May and June. There was no doubt that the vitamin deficiencies were the cause of the disease but climatic influences, mental depression and intercurrent diseases were contributory factors. Haemorrhagic conditions were well marked, affecting the mouth muscles, skin, and mucous membrane, with oedema, serous effusion, and dilatation of the heart. The rules laid down for treatment of scurvy cases of the hospital at Bagdad are given in full and it is noted that one of the most effectual remedies was a salad made of raw potatoes, onions, and vinegar.

Finally the author draws attention to the fact that in Feb 1917 a ration was sanctioned by the Indian government for troops in India which was less satisfactory than the field service ration responsible for the enormous outbreak of scurvy in the Indian troops in Mesopotamia and must render them again liable to outbreaks under conditions of stress which may at any time occur.

CHICK (Harriette) & DALYELL (Elsie J) Ueber die Gefahr des Skorbutus in Wien [The Danger of Scurvy in Vienna]—*Wien Klin Woch* 1919 Dec 18 Vol 32 No 51 pp 1219-1220

The authors, who have been working with the British Food Commission, report that owing to the suffering in the winter of 1918-1919 numberless cases of scurvy occurred in the spring particularly affecting suckling children Preventive measures are therefore urgently required

The danger of the disease is very great in Vienna, in suckling children, the chief causes are want of fresh milk, and its beneficial action is often greatly decreased by heating before use Transport difficulties are also a great factor under present conditions

It is pointed out that scurvy can be prevented in sucklings by simple means All artificially fed infants should have daily a small quantity of fresh fruit or vegetables, if the mother is not getting enough vitamins the breast fed children should also be given fresh fruit juice, (1) raw orange, (2) raw tomato or (3) raw swedes Some roots, like radishes, beets, etc., are almost useless as anti scorbutics Cabbage juice boiled for ten minutes at 100°C and boiled potato soups are good, raw juice of apples, grapes and carrots less so Five cc of raw lemon juice is sufficient to prevent scurvy in sucklings For older children and adults vegetables should not be cooked for more than 30 minutes, the raw liquor should be used and general rules must be followed with regard to cereals

A table is given of the relative anti-scorbutic values of substances in foods

Fresh cabbage leaves	110
Lemon juice	100
Orange juice	100
Swedes, juice	60
Fresh germinated peas, beans, lentils	30
Carrot juice	7.5
Juice of radishes, beetroot	7.5
Juice of beef	7.5
Potatoes cooked for 3 minutes at 100°C	7.5
Fresh cow's milk	1.0 to 1.5

P W B-S

McCARRISON (Robert) The Pathogenesis of Deficiency Diseases
IV The Influence of a Scorbutic Diet on the Adrenal Glands —
Ind Jl Med Res 1919 July Vol 7 No 1 pp 188-194
With 5 plates & 1 chart

Guinea-pigs were fed on a scorbutic diet of crushed oats and autoclaved milk and at death the condition of the adrenal glands was studied, the pathological changes being most carefully recorded, as also any evidence of a blood bacterial infection An organism was found in only one of five examined, this was of the Coh group and was not pathogenic to other guinea-pigs on subcutaneous inoculation even in large doses The results are shortly summarised as follows A scorbutic diet in guinea-pigs gives rise to —

(1) An increase in size and weight of the adrenal glands

- (2) A marked diminution in the adrenal content of these organs
- (3) Haemorrhagic infiltration of the adrenal glands, usually circumscribed in extent and situated round the periphery of the adrenal cortex
- (4) Degenerative changes in the cellular elements of the adrenal cortex and medulla

The author concludes that a scorbutic diet causes profound depreciation in the functional capacity of the adrenal glands in guinea-pigs and that the impairment of the adrenal function occurs before the clinical evidences of scurvy manifest themselves

Excellent plates illustrate the condition found

P W B-S

HESS (Alfred) & UNGER (L J) **The Scurvy of Guinea-Pigs**
 111 **The Effect of Age, Heat and Reaction on Anti-Scorbutic Foods**—*Jl of Biol Chem* 1919 June Vol 36 No 2
 pp 293-302 With 7 charts

In the determination of the effects of heat on the water soluble vitamins DENTON and KOHMAN concluded from experiments on rats that ordinary cooking did not perceptibly injure the nutritive value of carrots. The authors in experiments with guinea-pigs found that a very large part of the anti-scorbutic value was lost after cooking for 45 minutes but they draw attention to the important factors of the age and freshness. Young and fresh carrots are much more valuable than old ones, for the latter require longer boiling and contain less anti-scorbutic vitamins. This applies to other vegetables and is especially the case when these are dehydrated before use. This will have to be taken into consideration in judging the results obtained in experimental scurvy, for it makes comparative tables of foods difficult to interpret. It is also important to note that young vegetables are more cellular than older ones.

DANIELS and MCCLURG have reported that the liquor from cooked beans contains water soluble vitamins. The experiments carried out by the authors showed that the water in which carrots were cooked was of little or no value in protecting guinea-pigs from scurvy when young carrots were used. With regard to dried milk, though this is practically useless if prolonged heat has been employed, when the Just-Hatmaker process is used it loses little of its antiscorbutic power and infantile scurvy can be cured by giving dried milk of this variety. Canned strained tomatoes after one year were found to be both preventative and curative for guinea-pigs, a daily ration of 10 cc being sufficient. These also contain a considerable amount of anti-neuritic vitamins, 5 cc being able to cure pigeons. [This is rather remarkable and must depend upon the temperature used in preparation.]

The alkalinization of fruit juices follows the same rules as heating, viz., "The length of time the anti-scorbutic food is subjected to the deleterious influence is fully as important as the intensity of the process." A number of curves are given showing weights of the animals experimented on.

P W B-S

LEWIS (H B) **The Antiscorbutic Value of the Banana**—*Jl Biol Chemistry* 1919 Nov Vol 40 No 1 pp 91-101 With 4 charts

It has been shown by SUGIURA and BENEDICT that as a food the banana is deficient in protein and the water soluble B accessory factor HESS and UNGER observed that for the cure of infantile scurvy the banana has little value Experiments were carried out on young guinea-pigs of 300 grams in weight to demonstrate the anti-scurvy value of this food It was found (1) that guinea-pigs fed on an exclusive diet of bananas are unable to maintain their body weight and die in 20-30 days Autopsy reveals a condition of marked inanition, but no lesions characteristic of scurvy (2) Bananas in amounts greater than 25 grams daily as a supplement to a diet of rolled oats prevent the onset of scurvy Such a diet, however, does not permit normal growth in young animals Less than 25 grams of banana as a supplement to the oat diet does not protect against scurvy (3) Scurvy can be readily produced experimentally on a diet of autoclaved rolled oats supplemented by bran, milk, casein, and inorganic salts When such a diet is further supplemented by banana, 10-15 grams will serve to protect against scurvy Such a diet not only affords protection against scurvy but results in rapid growth of young guinea-pigs (4) These experiments suggest that a lower content of the antiscorbutic principle may be sufficient to protect against scurvy if the diet is adequate in its content of the other essential dietary constituents

† It is however indicated that the banana is greatly inferior to most other fruits and vegetables as an antiscorbutic

‡ Chart 3 Guinea-pig I received an exclusive banana diet up to the 20th day 10 gms of oatmeal were then added until the 93rd day, after which the oatmeal-casein cake was fed in place of the oatmeal

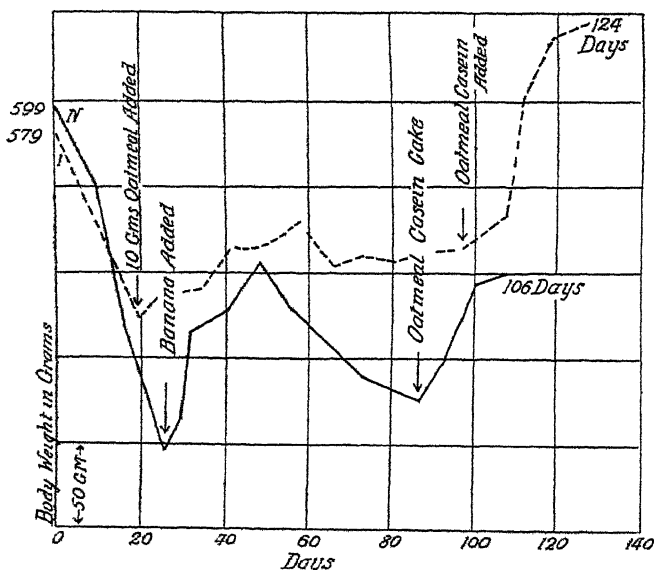


Chart 3

The animal was free from clinical symptoms of scorbutus throughout the period of the experiment

Guinea-pig N received rolled oats only for 24 days. Soreness and slight enlargement of the joints developed about the 18th day. 30 grams of banana as a supplement to the diet relieved the scorbutic symptoms although satisfactory growth was not made. When the oatmeal-casein cake was substituted for the rolled oats, rapid growth ensued.

P W B-S

YELLOW FEVER

NOGUCHI (Hideyo) **Etiology of Yellow Fever** X **Comparative Immunological Studies on *Leptospira icteroides* and *Leptospira icterohaemorrhagiae*** XI **Serum Treatment of Animals infected with *Leptospira icteroides***—*Jl Experim Med* 1920 Feb 1 Vol 31 No 2 pp 135-168

x—In a previous paper [see this *Bulletin*, Vol 14 p 223] it was shown that serum from yellow fever patients had a marked effect upon *Leptospira icteroides* derived from cases of the disease, as manifested by positive Pfeiffer reactions in the guinea-pig. In a few instances the serum protected the guinea pigs from a fatal infection with the organism. A similar result was obtained with the serum of guinea-pigs which had recovered from experimental infection.

In the present paper the question of immunity is more fully discussed, especially with reference to agglutination, lysis, complement fixation and Pfeiffer's reaction with immune sera prepared in rabbits and horses inoculated with *Leptospira icteroides*. Experiments were also conducted to determine the relation between this organism and *Leptospira icterohaemorrhagiae* by means of cross-immunity reactions *in vitro* and *in vivo*. In the latter not only passive but also active immunity has been considered.

Monovalent immune sera for each of four strains of *Leptospira icteroides* were prepared in rabbits by injecting the animals intravenously with 2 to 4 cc of rich live cultures, on rabbit serum medium, several times at intervals of 7 to 14 days. Polyvalent immune serum was produced in a horse by injecting intravenously gradually increasing amounts of rich live cultures, on horse serum medium, of five strains of the organism. During a period of 65 days the horse received 2,495cc of mixed live cultures in fifteen injections. Similar sera were prepared in rabbits and horse by injections of *Leptospira icterohaemorrhagiae*. With these sera and those of animals recovered from the disease experiments detailed in the paper were undertaken.

Monovalent *icteroides* sera possess the power to agglutinate *in vitro* not only homologous strains, but also all other strains of *Leptospira icteroides* tested. A slight effect, or none at all, was observed with these sera and *Leptospira icterohaemorrhagiae*. Similar results were obtained with *icterohaemorrhagiae* sera and the two *Leptospira*. The Pfeiffer reaction was specific for each group and gave a sharper differentiation.

Polyvalent sera showed a higher titre of neutralizing power for the cultures of homologous groups. It was found, however, that the sera are by no means specific, because the injection of a sufficient amount of anti-*icteroides* serum apparently prevented a fatal outcome in a guinea-pig inoculated with minimum lethal doses of culture of *Leptospira icterohaemorrhagiae*, and *vice versa*.

More or less specificity was shown by the complement fixation test. Weak fixation occurred when anti-*icteroides* serum was mixed with one or other of the *icterohaemorrhagiae* strains and conversely strong fixation occurred with the homologous strains.

The author concludes that on the basis of his findings with thirteen strains it is probable that *Leptospira icteroides* and *Leptospira icterohaemorrhagiae* are closely allied but distinct in their immunological

reactions. Perhaps the difference between the two may amount to that between subspecies or races. The pathogenicity of the two is distinct, for *icteroides* produces chiefly icterus and nephritis and *icterohaemorrhagiae* haemorrhage and nephritis, the icterus being less and the haemorrhage more pronounced in the evolution of the latter infection.

In the study of active immunity—exclusive of vaccination—difficulty has been experienced owing to the existence of natural resistance in some guinea pigs. A guinea-pig may recover from inoculation of *Leptospira icteroides* and then resist an inoculation with a virulent strain of *Leptospira icterohaemorrhagiae*. In such a case there may have been a natural resistance to the latter infection. Still there is not much doubt that an *icteroides* attack brings about, in some instances at least, a certain degree of resistance to the *icterohaemorrhagiae* infection.

The high potency attained by a polyvalent immune serum for *Leptospira icteroides* derived from the horse indicated that such a serum might have curative properties. To ascertain this point experiments were planned in which guinea-pigs were first inoculated with multiple lethal doses of *Leptospira icteroides* cultures and then treated with immune serum at varying intervals afterwards.

In determining the effect of serum upon infection the temperature and other characteristic clinical symptoms were noted and the extent of the lesion was ascertained by killing the surviving animals at a later period, when they were regarded as convalescent. The lesions chiefly considered, although not a wholly reliable index of the severity of infection, were the haemorrhagic foci in the lungs.

The results of the experiments were that the use of a polyvalent immune serum of high potency in the treatment of experimental infection of guinea-pigs with *Leptospira icteroides* proved of definite advantage in checking the progress of the infection. When given during the period of incubation the serum was capable of completely preventing the disease although on later examination haemorrhagic lesions were found in the lungs. Furthermore, the serum modified the course of the disease when used in its early stages. Employed at a later stage, when jaundice and nephritis has been present for several days and the animal was near collapse, the serum had no perceptible beneficial effect.

In man the clinical manifestations are more gradual and distinct than in the guinea-pig, yet the yellow fever patient whose temperature is subnormal, and who has reached the stage of haemorrhages from the gums, nose, stomach and intestines, and of uraemia and cholaemia, would seem to have little or no chance of benefit from the use of immune sera.

C M Wenyon

LEBREDO (MARIO G) Considerations Suggested by Publications of
Dr Noguchi on Experimental Yellow Fever—With Appendix
(Proc of the Amer Soc of Trop Med Atlantic City Meeting
June 16-17, 1919)—*New Orleans Med & Surg J* 1920
Feb Vol 72 No 8 pp 499-512

This paper is a criticism of the results of the investigations of NOGUCHI as described in the *Journal of Experimental Medicine* prior to

the appearance of his later papers, which were reviewed in this *Bulletin* Vol 15, pp 14-17. How far these subsequent results will affect the arguments of the author time alone will show.

The points brought forward are that NOGUCHI's work is incomplete and that any conclusions based on his discovery of *Leptospira ictteroides* as the cause of yellow fever, which might lead to a loss of confidence in the now well established and successful methods for combating the spread of the disease are to be deprecated. It is suggested that some at any rate of the cases with which NOGUCHI worked might in reality be cases of Weil's disease, that his claim of successful inoculation of animals in the light of previous failures by other workers, his discovery of the leptospira in the peripheral blood and liver after the repeated futile attempts at such discovery by others, the fact that the organism is both visible by the dark-field and yet filterable through the Chamberland filter, the success in infecting animals with blood taken from cases on the fifth and sixth days of the disease these and other discrepancies between NOGUCHI's results and what we know of the disease from previous investigations and the practical experience in its eradication justify us in taking a guarded view of the claim that *Leptospira ictteroides* is the cause of yellow fever.

The author regrets that the crucial test of transmission by the mosquito had not been carried out. [NOGUCHI's latest papers reviewed in this *Bulletin*, Vol 15, pp 15-16, describe successful transmission of the leptospira by *Aedes calopus* and if these results are accepted as sound by the writer of the paper under review his mind will be at rest.]

C M W

ELLIOTT (Charles A.) A Clinical Study of Yellow Fever Observations Made in Guayaquil, Ecuador in 1918—*Arch Intern Med* 1920 Feb 16 Vol 25 No 2 pp 174-205 With 22 text-figs

As the title indicates this paper is a clinical study of yellow fever. The writer was the clinician on the commission of the International Health Board of the Rockefeller Foundation which went to Guayaquil in the summer of 1918 to study the disease. The report is based on the study of seventy cases of yellow fever of all grades of severity. The paper contains nothing really new but gives a clear account of the disease and is well illustrated by photographs showing the generalized haemorrhages in various organs and the marked degeneration of the liver and kidneys.

SUMMARY

"1 The clinical and pathologic findings are summarised from a study of about seventy cases of yellow fever observed in Guayaquil, Ecuador, during the summer of 1918.

"2 Clinically, yellow fever is similar to infectious jaundice. The differences existing between the two diseases appear to be chiefly those of degree. There is more marked jaundice and less hemorrhage in yellow fever than in infectious jaundice.

"3 Although hemorrhage is a usual occurrence in all severe cases, yellow fever is not a true hemorrhagic disease. The hemorrhage apparently follows necrosis of parenchymatous tissues and endothelial cells.

"4 The jaundice of yellow fever appears to be of nontoxic dissociated, hepatic (suppression) type.

"5 Death appears to be due to uremia. It is usually preceded by anuria. There is an intense degeneration of the epithelium of the convoluted tubules. The glomeruli and collecting tubes remain relatively free from degeneration.

"6 Convalescence in all patients who survive is prompt. The complete restitution of all organs to normal is remarkable. No evidences of impaired liver or kidney function remained, although intense parenchymatous changes must have occurred."

C M W

ARAGÃO (Henrique de Beaurepaire) **Primeiros resultados do tratamento da febre amarela pelo neo-salvarsan** Nota previa [First Results in the Treatment of Yellow Fever by Neo-Salvarsan]—*Brazil Medico* 1919 June Vol 33 No 26 p 201

The author states that he recommended the use of salvarsan and "914" in the treatment of yellow fever in 1917 [thus *Bulletin*, Vol 13, p 250]. So far seven cases treated by neosalvarsan have been reported to him by colleagues with two deaths. The treatment, to be effectual, must be entered upon during the first 3 days of the disease and the initial dose should be massive—90 centigrammes—with a view to the rapid and complete sterilisation of the organism. A further and more detailed paper on the subject is promised.

F S Arnold

GUTHRIE (J Birney) **Blood Pressure in Yellow Fever**—*New Orleans Med & Surg J* 1920 Jan Vol 72 No 7 pp 420-425
With 1 text-fig

The only previous records of blood pressure during yellow fever are those of FERRARI of Brazil (*Brazil-Medico*, 1903), and Paul AZEVEDO (Inaugural thesis, Rio de Janeiro, 1903), who quoted FERRARI's work. AZEVEDO noted a progressive drop in blood pressure from the first hours of the disease. During the first day the pressure was on an average 114 mm while in fatal cases it fell to as low as 107 mm. During convalescence there was a gradual rise to the normal. AZEVEDO discussed FERRARI's statement that a pressure of 126-128 mm during the first 24 hours of illness was an important diagnostic sign. AZEVEDO did not consider blood pressure of any diagnostic value.

The observations recorded by the present writer were made in 1905 at New Orleans. The instrument used was Cook's modification of the Riva Rocci sphygmomanometer with the 10 cm arm band. Only the systolic pressure was recorded. A chart was designed so that the pulse beats and blood pressure per minute were recorded in such a way that whenever the former equalled the latter in millimetres the curves coincided. It was found that the blood pressure to a large extent paralleled the pulse rate with a distinct interval between them in the male and a smaller interval in the female. In the latter touching and crossing of the curves was more frequent. In the male the interval is most strikingly shown. Even with a rising temperature there is a gradual decline of the pulse and pressure curves. This parallelism of the two curves constitutes a diagnostic point of no little value. In a series of 45 cases, mild, severe and fatal, the blood pressure was never above normal after the first day the average pressure being 118.2 mm. Cases were seen in which the pressure was above

normal on the first day but this was most probably due to pain, excitement or some other psychic factor. Of a series of fatal cases 19 or 55.7 per cent showed touching or crossing of the curves. The highest recorded pressure was 275 mm, seen during a chill, and the lowest 50 mm. Both cases recovered.

The factors which cause fall of blood pressure during yellow fever are vasomotor dilatation, myocardial degeneration, slowing of heart from vagus stimulation due to jaundice, the action of bile on the heart itself, low diet, rest and later, haemorrhages from mucous surfaces, the result of fatty arteritis.

The continued haemorrhagic tendency is due to vasomotor conditions and capillary degeneration rather than to diminished coagulability of the blood. The coagulability was normal in all cases tested by Wright's coagulimeter. The black vomit lowers blood pressure and is in this respect protective but the act of vomiting greatly raises the pressure and produces the numerous meningeal haemorrhages which were seen at all the autopsies. It is possible that the severe nephritis of serious and fatal cases may account for the higher blood pressure in these.

The author is forced to the conclusion that a low average blood pressure is a favourable prognostic sign of no little importance and that if charted with the pulse rate the crossing or touching of the two curves is of grave significance in the case of a male adult where the diagnosis of yellow fever is already established.

The falling blood pressure is a protection to the weakened vessels and is the keynote to treatment of the disease. The axiomatic precautions observed during illness and convalescence, namely the avoidance of all exertions and excitements, find their rationale in the consideration of the blood pressure. Therapeutic measures must be directed to the regulation of the blood pressure and the quantities of saline sometimes administered to prevent plugging of the renal tubules may by increasing blood pressure produce fatal haemorrhagic accidents. The author does not advise the administration of drugs to bring about a fall in blood pressure. Drugs play a small part in the treatment of yellow fever but physical means for keeping down blood pressure will contribute towards the safety of the patient.

C M W

CARTER (H. R.) The Mechanism of the Spontaneous Elimination of Yellow Fever from Endemic Centers (Proc of the Amer Soc of Trop Med Atlantic City Meeting June 16-17 1919)—*New Orleans Med & Surg J* 1919 Dec Vol 72 No 6 pp 347-360

The present contribution is largely an elaboration of a previous paper [this *Bulletin*, Vol 10, p 219]. The author discusses the well-known phenomenon of the spontaneous disappearance of yellow fever from some endemic centres in tropical America, as evidenced by the fact that no cases have been reported subsequent to the immigration of large numbers of non-immunes and in spite of the presence of *Stegomyia* mosquitoes in abundance. He states that spontaneous disappearance of the disease is observed only in towns of moderate

size or in large towns such as Demerara, Port au Prince and Cartagena, to which immigration has declined on account of diminished commercial prosperity. It occurs when the number of susceptible persons (adults or new-born) is small. In such towns the existing population has acquired immunity and the disease disappears on account of the failure of the human host and the death of mosquitoes harbouring the virus.

In large towns with considerable susceptible immigration such as Guayaquil, Havana and Vera Cruz spontaneous disappearance has not occurred.

E. J. WILKINSON

CONNOR (M. E.) **Yellow Fever Control in Ecuador Preliminary Report**—*Jl Amer Med Assoc* 1920 March 6 Vol 74 No 10 pp 650-651

An account of the anti-*Stegomyia* campaign in Guayaquil since Nov. 24, 1918, shows that the fall in incidence of yellow fever coincided with the screening of water tanks and receptacles. Galvanized iron covers were found to be cheaper than and superior to either wooden or copper ones. The former were often taken and used as firewood and the latter admitted rats to the water tanks.

Fish were also used. The "huarjas," a fish of the perch family, was a voracious larva eater but it wearied of its confinement in the containers and would jump three and sometimes four feet to escape. It was abandoned for the chata and the chalaco which proved more satisfactory. Millions were given a trial but they were more delicate and did not survive so long as the others. As long as fish are available they are to be used for all containers other than tanks.

C. M. WILKINSON

(1) TOPPES (Theophilo) **Febre amarella em Pernambuco e na Bahia**—*Brazil Medico* 1919 July 19 Vol 33 No 29 pp 230-231

(2) TORRES (Theophilo) & SILVA (JAYME) **Febre amarella na Bahia**—*Ibid* p 231

(1) Report of a speech made by Dr. Torres at a meeting of the National Academy of Medicine at Rio on 19th June 1919. The speech was in answer to an angry telegram sent by the Medical Society of Recife (Pernambuco) protesting against the action of Dr. Torres as Director General of Public Health in sending down to Recife a commission to advise as to an anti-*Stegomyia* campaign there. "We must finish" says Dr. Torres "with the *stegomyia* and the federal medical commissions are sent simply with that end in view. The work is not difficult but experience is necessary and an anti-mosquito campaign carried out on wrong lines may do more harm than good."

(2) A very brief summary of a speech made by Dr. Torres at a meeting of the National Academy of Medicine Rio on June 26, 1919 giving an account of an anti yellow fever campaign at Bahia and reporting considerable improvement as the result.

F. S. A.

REVIEWS

ALCOCK (A) [C I E M B, L L D, F R S] **Entomology for Medical Officers** (Second Edition—Revised)—xv + 380 pp Frontispiece + 197 text figures 1920 London Guiney & Jackson [Price 18s net]

Those to whom this book is addressed are fortunate people. The "systematic" entomologist, who spends laborious days in unending struggle with taxonomical problems, may fail to sleep o' nights when waking dreams are haunted by visions of species without number, or complicated questions of synonymy still twist their tiresome way through weary brain. Not so the Medical Officer, whose task it is to wage war upon an insect enemy. Happy in the knowledge that the number of species of Arthropod, recognised as actively or passively associated with disease in man still falls far short of a century, he can turn to his "Alcock" and, with minimal expenditure of time and trouble, discover the name and lineage of his foe, and withal how to entreat him. Which is another way of saying that those who fare forth to practice the cult of Aesculapius beyond the seas should on no account omit to include among their necessarily limited libraries a copy of the handy, well arranged, and altogether admirable volume before us.

Using the term "Entomology" in the conveniently comprehensive, if nowadays archaic Latreillian sense, Col Alcock includes within his purview not only the Insects proper, but also Arachnids (ticks, mites, scorpions, spiders, etc.), Myriapods (centipedes and millipedes) and Crustaceans—in fact practically the whole of the Arthropoda. The first five and twenty pages of the book are devoted to a concise but lucid account of "Zoological Classification and Nomenclature," "The Phylum Arthropoda," and "Arthropoda in their General Relations to Human Pathology." The next chapter is concerned with a brief discussion and description of the chief modes of dealing with disease disseminating Arthropods, after which the bulk of the book, amounting to 268 pages, is devoted to Insects, among which the Diptera naturally occupy the major part of the space.

Synoptic tables for the determination of Families are given, and, in the case of the larger Families which include pathogenic species, there are similar "short cuts" to the identification of genera also, the genus *Glossina* (Tsetse flies) is provided with a tabular "Synopsis of Species" (adapted from AUSTEN). All species known to transmit disease to man are briefly characterised, as are the species of *Phlebotomus* described down to last year, a geographical grouping being adopted where necessary for convenience of reference. Similar short descriptions are given of certain other forms, such as common tropical species of *Culex*, representatives of the genus *Aedes* more or less resembling *Stegomyia fasciata*, and the chief blood sucking Muscidae other than *Glossina*. The essential facts that it is necessary for the medical officer to know about mosquitoes, including methods of control, are compressed into sixty three pages. In dealing with the species of *Anopheles*, which the author wisely, and in accordance with present practice, treats as forming a single genus, the proved malaria carriers on the one hand and the suspected carriers on the other are distinctively denoted. According to Col Alcock, the members of the former category number thirty included in this total, however, is the European *Anopheles hispaniola*, Theob., which is correctly stated to be probably synonymous with *A. turkhudei*, Latson, a species, by the way, that, like the closely allied *A. palestiniensis*, Theob. (now regarded as a form of *A. superpictus*, Grassi), deposits its eggs not singly but in "ribands." In default of precise observation or experimental proof, difference of opinion naturally exists as regards the "hospitality" of many *Anopheles* to malaria parasites, thus, while the author includes the common Tropical African *A. costalis*, Lw., among the species "regarding which the evidence is either conflicting or merely circumstantial," it is according to another recent writer (H. CURWEN, "Zanzibar Protectorate Ann. Rept. Pub. Health for the Year 1916") the common malaria carrier in Zanzibar.

In this connection a sentence at the commencement of the chapter on "The Anopheles" in the work under review deserves the widest publicity, and is worth quoting *in extenso*. There is still," writes Col Alcock, "a wide field for observation and experiment, which every medical officer who has time and opportunity may investigate with advantage, three of the questions much requiring further attention being (a) the exact duration of the individual infection in a well infected mosquito, and (b) the factors which may influence the infectibility of a susceptible species, and (c), most important of all, what species occur naturally infected." That there is real need for practical investigation on these lines is beyond dispute, and, since medical men in the Tropics, like their colleagues elsewhere, often have their hands over full already, we would venture to suggest that some munificent patron of research, seeking an outlet for his altruism, might do worse than provide a special expedition equipped for at least a five years' sojourn in all parts of the world, with the means of solving the questions at issue. As regards the "duration of the individual infection" in a malaria carrying mosquito, it may be noted that, according to a brilliant French investigator (ROUBAUD), in the case of the Palaearctic *Anopheles maculipennis*, at any rate, it would appear to be brief. Should the same condition hold good for all malarial mosquitoes, these insects would provide a marked contrast to Tsetse flies, which, once infected with Trypanosomes, apparently remain so for life.

During the recent campaigns in Palestine and Mesopotamia, much trouble was caused at times by the temporarily incapacitating but fortunately non fatal malady termed "sand fly fever," disseminated by the tiny and elusive little midge known as *Phlebotomus papatasi*, which as the present reviewer can testify, like certain species of *Anopheles* does not invariably confine its attacks to the hours of darkness. We are glad to see that Col Alcock, writing of the Family (Psychodidae) to which this insect belongs, gives "Moth like Midges" as the vernacular equivalent, rejecting the singularly inappropriate neologism "Owl Midges." A word of commendation is also due to the author for sounding a few pages further on, a note of caution as to the supposed immutability of the chaps of male *Phlebotomus*. The corresponding organs in many groups of insects, notably in mosquitoes, often afford diagnostic characters of the greatest value for the distinction and recognition of species, but nowadays there is a tendency in some quarters to place too high a value on minute differences in male genitalia, regardless of the danger, known to every cautious systematist, of attempting to characterise a supposed species from a solitary specimen.

The Tsetse flies, to which sixteen pages are devoted, have already been mentioned, and must not further detain us. Passing over the remainder of the blood sucking Diptera—Ceratopogoninae, Simuliidae, Tabanidae, Stomoxydinae and Pupipara, all of which, though in many cases fearsome plagues, especially to stock, are of minor importance to the medical officer, we need merely note that all are adequately treated, and that the author provides much useful information concerning allied Families. Some of the latter, though harmless or even beneficial to man, include species liable to be mistaken for blood suckers by the uninitiated. Turning to "Muscidae that do not Suck Blood," we are glad to find half a dozen pages concerned with the insufferable House fly, a pest of the first magnitude, never likely to be forgotten by any ex commander of a Sanitary Section who served in the Great War. In recent years *Musca domestica* has received much attention from economic entomologists of many nations and not a few medical men, and Col Alcock gives us a convenient summary of the latest methods for its discomfiture.

Bidding adieu to the Diptera, and passing on to the other Orders of Insects that include pathogenic forms, we find a chapter concerned with the plague flea and its allies (Siphonaptera), and including a synopsis of the genera that the entomological Medical Officer should be able to recognise. Bugs—using the term in its orthodox sense as the equivalent of Rhynchota—naturally form the subject of the following chapter. Though to some these insects may have waned in interest since the casting of doubt on the ability of bed bugs to transmit kala azar, the tolerance to the plague bacillus shown by both *Cimex lectularius* and *C. rotundatus*,

and the established fact that the Brazilian *Conoithinus megistus* is a carrier of a dangerous form of human trypanosomiasis, fully warrant their inclusion in the 'Black List'. As regards the eradication of bed bugs, we observe that Col Alcock pretends fumigation with sulphur, and that elsewhere he rightly urges 'the greatest caution' in the use of hydrocyanic acid gas; however it is perhaps permissible to remark in a medical journal that, in Cairo during the War, the latter method was found to be the only effective treatment for bug ridden barrack rooms.

Since the dawn of history, no insect can have contributed so much to the sum of human misery as the body louse, and with the discovery of its agency in the dissemination of typhus, trench fever, and some forms of relapsing fever its reputation is now black indeed. To each of the belligerents in the recent conflict this scourge of armies was the subject of the gravest concern: a volume would be needed for the reproduction of the 'literature' published concerning it during the struggle, and many and various were the practical expedients devised for its destruction. Who that witnessed it can ever forget the sight of the "Disinfecting Train" in Palestine, surrounded by a happy though naked throng awaiting the return of its garments from the purifying embrace of superheated steam? With the chapter in Col Alcock's book dealing with the "Blood Sucking Lice" the account of the known insect disseminators of disease in man is concluded. The remainder of the volume is concerned with the non blood sucking Orders of Insects (with all of which the competent medical officer in the Tropics should have at least a nodding acquaintance), and with the other groups of Arthropoda mentioned above. Eighteen pages are devoted to the Ticks, the salient facts with regard to which are presented by the author with the conciseness and precision displayed in his treatment of the Insects. The work closes with a Bibliography, and an adequate Index. A word of praise is due to the illustrations, the figures in the text are clearly drawn, labelled and printed, and really serve their ostensible purpose, while the charming portrait of Sir Patrick MANSON with his grandson on his knee, which appropriately forms the frontispiece, adds a peculiarly pleasing, human touch. There is also another detail which, though not strictly germane to the matter in hand, we hope to be pardoned for mentioning. Despite conspicuous instances that might be quoted to the contrary, the writings of scientists are too often the quintessence of aridity, and read like direct transcripts from laboratory notebooks. But Col Alcock's style wherever the subject affords it scope (including the delightfully allusive quotations with which his work is garnished), not only adds to the pleasure of perusal, but suffices to prove that a lifetime devoted to microscope and scalpel need not necessarily connote divorce from "litterae humaniores". In taking leave of this volume, which we do with sincere regret, we tender our congratulations to its author. The information amassed within its covers, in so far as we are competent to express an opinion, is in all cases abreast of the times, and the book supplies a want.

E E Austen

FLETCHER (Cavendish) [MB, BS, MRCS, LRCP] & McLEAN (Hugh) [BA, BC, DPH, MRCS, LRCP] **The Link between the Practitioner and the Laboratory. A Guide to the Practitioner in his Relations with the Pathological Laboratory**—91 pp. With 7 diagrams in text. 1920. London. H K Lewis & Co. Ltd. [Price 4s 6d net.]

This little book written by two members of the Staff of the Laboratories of Pathology and Public Health, 6 Harley Street, London, is intended, as the title suggests, to supply the link between the practitioner and the laboratory and doubtless, under present conditions of medical practice, a guide of this kind which indicates the right kind of material to send to the laboratory and the right way to send it, performs a useful purpose. How far the real needs of the practitioner can be met by reports on pathological material submitted to a laboratory situated, it may be, at some distance

away, is a question which has recently been debated in the medical press. The reviewer at least is satisfied that nothing can compensate for the active co-operation of practitioner and pathologist over a case. Failing such co-operation the practitioner will continue to call for useless or unnecessary investigations to receive in return bald and often uninterpretable reports. The major part of the book consists of an alphabetical list of diseases with the pathological tests appropriate to each. Thus a practitioner faced with a case of appendicitis may send blood for a leucocyte count, blood films for the glycogen reaction which, if positive, denotes a serious condition according to the authors, or he may send the actual appendix after excision for histological examination. A useful section is devoted to approved methods of collecting material of various kinds for dispatch to the laboratory and in the latter portion of the book the principles of vaccine and serum therapy including the use of ordinary vaccines, detoxicated vaccines and sensitised vaccines are all too briefly discussed.

J C G Ledingham

MENSE (Carl) *Handbuch der Tropenkrankheiten 2te Auflage Band 5 Die Malaria und das Schwarzwasserfieber* (von Prof Dr Hans ZIEVANN)—xx+602 pp With 141 text figs & 7 coloured plates 1918 Leipzig Johann Ambrosius Barth [Price M 40]

Our idea of the text book is that it is a book in which is given, in concise form, the state of our knowledge on any given subject. The author of such a book has weighed the conflicting evidence, i.e., subjected it to his trained judgment and personal experience. He may be wrong in his judgment but at any rate the student is presented with a concise account, intelligible to him, if the author has the gift of exposition. Such a summary the student of medicine has the opportunity of putting to the test when he commences his practice. We believe that it is exceptional for him to do this and break the fetters rightly at first imposed upon him by his text book or teachers, and to think for himself, or better, observe for himself. Hence it is that the opinions of many medical men of "long experience" are of no particular value unless we know that the experience has been put to profitable use. The appeal to "experience" on the part of many writers is only a veiled appeal to "authority."

In the treatise the author takes the reader beyond the stage of dogmatism. He points out that Smith says this while Robinson flatly contradicts him and is not content with simply saying so, but endeavours to give Smith's and Robinson's facts, if respectively, they have any, and to explain why it is he prefers Robinson's conclusions to Smith's or vice versa. He weighs the evidence but he partly at least shows the reader what the nature of the evidence is. If, however, the reader simply finds that A, B and C state one thing and D, E and F another he is confused, or if A, B and C have acquired, say by judicious advertisement, the status of "authorities" he very probably accepts their views and thinks "small beer" of those of D, E and F.

In the work before us we find a host of names and the student has frequently no means of ascertaining whether Smith, who is quoted as an authority is an "ass," or whether Robinson, who is merely alluded to, is not in fact worthier of credit. If, however, the student can stand alone requiring no further help, such a treatise as this is serviceable as a guide to the literature which he can consult and there weigh the evidence for himself. The list of authors quoted extends to about 36 columns.

We will now take examples almost at random, to illustrate how some of the problems of malaria are treated.—

1. XVII Larval Malaria p 269 The author defines this as a malaria infection expressing itself not as a fever attack but through some other regularly intermittent symptom the principal symptom is neuralgia, although all the organic systems may be affected, e.g., successive, irritative or depressory symptoms affecting the respiratory system, the skin, the eyes, the ears, leading to faintness, hæmorrhage, etc.

Horvorka (whose paper is entitled "The aphorisms of an old malaria practitioner") who has great experience of malaria "saw a case in

which daily, unilateral coryza ensued at 3 p.m., and further a case in which pain in the region of the gall bladder arose every 3rd day, lasting for the same length of time. After energetic quinine treatment the symptoms disappeared." The author, though expressing some scepticism in the matter, states that in the Cameroons he treated periodically recurring migraine with quinine and active sweating with the best results. It appears to us that in the three pages devoted to the subject there is much discussion but little solid information. The following three extracts seem to lead us off the earth into the realms of the unknown.

2 "according to the author's unfinished experiments the addition of the serum of a chronic malaria to the malaria blood of an acute case appears to increase phagocytosis. Possibly we have to do with the presence of malaria opsonins" (p. 160) and 3 "we assume that the cells of the lymphatic system contain a ferment which probably plays a part in fat digestion which forms oxydases and proteolytic ferments in the neutrophil leucocytes which can assimilate foreign proteids while the eosinophils contain only oxydases" (p. 161). 4 "For the malarialogist it (the spleen) has still significance as a blood forming organ, comparable to a blood sponge which regulates the circulation in the abdominal organs and perhaps also exercises antihæmolytic and antitoxic properties" (p. 174).

If we turn next to the consideration of a question which should apparently be capable of answer, viz., the length of the relapse interval, we find that for simple tertian, MARIOTTI BIANCHI is quoted as giving the time as 5-18 days and CACCINI as 14-21 days. We have had occasion to study CACCINI's papers closely, not as they have appeared with numerous errors in an English translation, but in the Italian original. One peculiarity of CACCINI's figures is that no relapse is recorded as occurring later than 21 days. It is inconceivable that none should occur say on the twenty second day. If 21 days was the limit of CACCINI's observation period after treatment was stopped this would explain his figures, assuming their correctness in other respects, but CACCINI says nothing about his observation period, a definition of which is fundamental in determining this question of the relapse period. Nor does the author shew any appreciation of the fact, one must admit, however, that he is not alone in this matter as a reference to almost any text book dealing with the subject will shew.

When we come to the question of the after treatment of a malaria attack the procedures recorded are numerous, in fact "quot homines, tot sententiae." The subject will remain in this state of chaos so long as the various "cures" are unsupported by evidence as, for example, that recorded in a recent discussion on the matter, viz., "in certain cases St Ivel's Cheese undoubtedly is of great value." In this connection we may, perhaps, ask what has become lately of Warburg's tincture the virtues of which have been sung (without evidence) for so many generations?

During our perusal of the book we noted many other points for comment but we think we have given sufficient examples to give some idea of the character of the work. It is impossible, in a short review, to sum up the contents of 600 pages, dealing with almost all aspects of malaria. We can only add that though we have closely read the discussion on several questions we have been baffled in trying to form a definite opinion. That a book of this kind may serve the purpose of a comprehensive guide we have already said. The nature of the contents however, lead us to conclude that the value of this treatise and, indeed, other treatises of this kind is questionable, and that a better service would be rendered to the progress of science by a thorough critical survey of one or two aspects only of the matter.

J W W Stephens

CASTELLANI (Aldo) & CHALMERS (Albert J) **Manual of Tropical Medicine** Third Edition—1919 London Baillière Tindall & Cox Price 45s net [Part II Section C Division I pp 285-921 Animal Parasites]

The mass of valuable information collected in these 637 pages is enormous. Its amount and variety justify MANSON's precept that in the tropics a

medical man must be a naturalist before he can hope to shine as a sanitarian, or as a pathologist, or even as a complete practitioner, though at the same time they will cause the countenance of any but the most resolute student of tropical medicine to besicckle over with the pale cast of thought

The authors must again be congratulated on having aimed at a high academic standard, though in their conscientious attempt to make their work complete in every respect they have burdened it with more of the forbidding taxonomic apparatus of the zoologist than the medical man requires, and sometimes indeed—as in the treatment of the intermediary pond snail hosts of certain flukes—with even more than anyone but a most accomplished malacologist can understand and apply

In the allotment of their work the authors, after a general introduction on parasitism, give 264 descriptive pages to the Protozoa, 133 to worms, 183 to Arthropods, and 50 to animals considered as carriers of infection

The initial definition of a parasite, as a living organism which takes up its abode temporarily or permanently on or within other living organisms for the purpose of obtaining food, though happily it does not interfere with the immediate practical design of this treatise, is one that challenges criticism in whatsoever book it may be affirmed, particularly in these days when in many lands a discontented and half educated proletariat is inclined to esteem no act but that of hand " and incontinently to apply the term ' parasite ' to all who obtain their food by professional and other mental work The objection to the definition is not merely that it includes two antipathetic concepts, namely symbiosis and rapine, but that it tends to obscure the great biological truth—a truth so full of significance for the sanitarian in the tropics—that in Nature every living species leans on other species in an organic environment It is the business of the medical biologist above all other men to impart a clear understanding of the term " parasite " as being limited to organisms whose settled object is to live at ample point upon the loss and damage of other organisms, and to insist on a no less clear recognition of the fact that in Nature there are many living organisms which cannot live and get food otherwise than by taking up their abode either on or within other living organisms to whose very existence they are absolutely essential—two different and distinct kinds of organisms being united in, and sometimes structurally adapted to, a single concerted life interest

The account of the Protozoan parasites—among which the *Spirochaetes* are included—is particularly full, and is very amply illustrated DOBELL'S latest work probably came too late for inclusion, for it is not noticed in the list of references, and the authors maintain *Loeschia* as the generic appellation of *Entamoeba histolytica* and *E. coli* No one will dispute the separate maintenance of the malignant tertian parasite in the distinct genus *Laverania*, on account of the crescent shaped gametocyte and the schizogony in internal organs these undoubtedly can be regarded as generalised or " primitive " characters, whatever be one's views as to the evolution of the malaria parasites In the account of the genus *Plasmodium* the process of parthenogenesis is described (p 507) although in the general introduction the reality of the phenomenon is referred to with hesitation (p 295), no mention, however, is made of the accurate observations and discriminative arguments (*Jl R A M C*, Oct 1917) by which J D THOMSON disclosed a very prosaic interpretation of the phenomena, as well as a very serious flaw in the assumptions, upon which SCHAUDINN'S theory of parthenogenesis of the malaria parasites was based Again in the account of the genus *Haemoproteus* no notice has been taken of the very strong presumptive evidence adduced by Mrs Helen ADRIE to show that in the case of *H. columbae* sporocysts are formed in the stomach wall of the Hippoboscid fly (*Lynchia*), and that the pigeon is infected by sporozoites from the fly's salivary glands in complete analogy with the established facts of *Plasmodium* and *Proteosoma* dissemination

The authors can hardly expect their new " classification " of the Trypanosomes to obtain that general acceptance which, after all, is the only seal of a classification In zoology a natural classification whatever else it may express is supposed to represent, in the form of an ordered series of precise and more or less comprehensive generalisations, certain known and verifiable facts of form and structural feature and in starting such a classification

the accepted method is, after an exhaustive comparison of all the species concerned, to arrange them according to their agreement or disagreement with certain determined and verifiable morphological standards. In this particular scheme, however, the Trypanosomes are arranged to begin with according to their organic habitat—whether in an invertebrate, or in a cold blooded vertebrate, or in a warm blooded vertebrate—and their cyclical development and ontogeny, which in most cases is not known, and the result is not a zoological classification representing accurate generalisations of sifted fact, but merely a cataloguing of species into host groups, pathogenic and non pathogenic groups, and “forms carefully studied” and “classifiable,” and “forms not yet fully studied” and “unclassifiable.” That in the fulness of time it may be necessary, in dealing with Trypanosomes structurally indistinguishable, to establish *varietal* and *specific* distinctions in respect of physiological or pathological differences is, of course, quite a different matter, but to burden the nomenclature with the names of “new genera” founded on such elusive phenomena is hardly to be commended.

One of the features of the section on worms are the reproductions of microphotographs taken by J J BELL. In the account of the Trematodes the pioneer work (in 1913) of MIYAIRI and SUZUKI on the life history of *Schistosoma japonicum* is briefly mentioned in the text, but—probably because it was published in Japanese—it does not appear in the list of references. The paper, however, in which the highly important original investigations of MIYAIRI and SUZUKI were published was reviewed in this *Bulletin*, 1914 Vol 3 pp 289-290. Again, in the account of the Nematodes, though FEDCHENKO's original discovery of *Cyclops* as the intermediary host of the guinea worm is briefly mentioned, no reference is given to the journal (*Bull Imp Soc Friends of Nat Hist Anthropol Ethnogr Moscow* Tom VIII 1869) in which this pre eminent discovery is related.

In most respects the section on Arthropoda is excellent, and the illustrations, over 150 in number, are very good. In dealing with the mosquitoes the authors have done themselves wrong in disregarding the exhaustive treatise of HOWARD, DYAR and KNAB and in dealing with the Tsetse flies they have not included any recent investigations of the bionomy of the important species.

In discussing animal “carriers” the authors adhere to the opinion that where two hosts are concerned in the business the “definitive” host is the one in which the gametes fulfil their destiny, not the one in which the gametocytes are formed. They therefore uphold the view that man is the intermediate host and the Anopheles mosquito the definitive host of the malaria parasites, and incline favourably to the theory that the original of the malaria parasite must have been a coccidiform intestinal parasite of the mosquito. They thus exclude from the unbounded range of speculation any possible surmise that the main points in the life cycle of the foreshadowed *Plasmodium malariae* might in the wondrous course of evolution have been hammered out as independently of Anopheles as of Homo, and that the Homo Plasmodium Anopheles drama might possibly be as it were a sort of scene shifting or stage adaptation of, or epilogue to, some other of Nature's biological compositions.

The above points we have selected for criticism not because they are to be considered defects so much as distractions, for of the pages as a whole we can only repeat that they are a store house of most accessibly arranged information of inestimable value to the student of animal parasitology.

The authors do not concern themselves with etymology but in their statement that *Τρηματώδης* signifies “pierced by holes” they are at variance with Luddell & Scott, who give the word as being used by ARISTOTLE for animals that burrow and live in holes.

Such errors as “Staunton” (p 886), “Addie” (887), “Thompson” (p 404) for names so well known professionally as A T STANTON, J D. THOMSON, and the late J R ADIE must be due to accident, as also “Quarterly Journal of the Medical Society” (p 594) for “Quarterly Journal of Microscopical Science.” More serious accidents disfigure pp 893 and 894, where an elongate turret shell is labelled “*Physopsis africanus*” and the statement is appended that this species is the carrier of *Schistosoma*

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The bracketed abbreviations after the page numbers indicate the subject

Am	signifies Amoebiasis and Amoebic Dysentery	Mal	„	Malaria
Bb	„ Beriberi	Misc	„	Miscellaneous
Bl	„ Blackwater	Pel	„	Pellagra
B R	„ Book Review	Pl	„	Plague
Chl	„ Cholera	R F	„	Relapsing Fever
Dvs	„ Dysentery (Bacillary & Unclassed)	Sc	„	Scurvy
Ent	„ Enteric Fevers	Sk	„	Skin Diseases
Fev	„ Fevers	Sp	„	Sprue
Hel	„ Helminthiasis	S S	„	Sleeping Sickness
H S	„ Heat Stroke	Tb	„	Tuberculosis
K A	„ Kala Azar	Und	„	Undulant Fever
Lep	„ Leprosy	Ys	„	Yaws
		Y F	„	Yellow Fever
		Z	„	Medical Zoology

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- DE VOGEL (W T) De Taak van den Burgerlijken Geneeskundigen Dienst in Nederlandsch Indie —*Koloniaal Instituut* Amsterdam 1917 Mededeeling No 8 Afdeeling Tropische Hygiene No 4 61 pp With 4 plates, 1 chart & 1 map, 1917 Amsterdam Ellerman, Harms & Co [Price f 1]
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- WIENER (E) Kurzer Bericht ueber die Krankenbewegung im Infektions spital der internationalen Quarantanstation in Tor (Chefarzt 1913-14, Dr Emil Wiener) —*Wien Klin Woch*, 1914 Sept 21 Vol 27 No 39 pp 1319-1322 [Rec Mar 1920]

[See also under Disease Headings.]

TROPICAL DISEASES BUREAU LIBRARY.

JOURNALS

NOTE The date and volume number following the title indicate the earliest volume of the series which the library possesses. Dashes after the date and volume number indicate that the intervening parts (unless otherwise stated) are complete to the date of publication of this list

Series which are complete from the commencement are italicised

Some of the foreign journals are not up to date

EUROPE

GREAT BRITAIN AND IRELAND

<i>Annals of Tropical Medicine & Parasitology (Liverpool)</i>	1907 —	Vol 1—	
British Medical Journal (London)	1876—		
<i>Bulletin of Entomological Research (London)</i>	1910—	Vol. 1—	
Department of Agriculture & Technical Instruction for Ireland Journal (Dublin)	1901—	Vol 2—	
Edinburgh Medical Journal (Edinburgh)	1908—	(New ser)	Vol, 1—
Glasgow Medical Journal (Glasgow)	1909—	Vol 71—	
Hospital (London)			
Journal of the Board of Agriculture (London)	1913—	Vol. 20—	
Journal of Comparative Pathology & Therapeutics (Edinburgh & London)	1908—	Vol 21—	
<i>Journal of Hygiene (Cambridge)</i>	1901—	Vol 1—	
<i>Journal of Pathology & Bacteriology (Cambridge)</i>	1892—	Vol 1—	
<i>Journal of the Royal Army Medical Corps (London)</i>	1903—	Vol. 1—	
<i>Journal of the Royal Naval Medical Service (London)</i>	1915—	Vol 1—	
Journal of State Medicine (London)	1913—	Vol 21—	
<i>Journal of Tropical Medicine & Hygiene (London)</i>	1898—	Vol 1—	
Lancet (London)	1824—42	[Incomplete]	1843—
<i>Lister Institute. Collected Papers (London)</i>	1904—	Vol 1—	
<i>Medical Science Abstracts and Reviews (London)</i>	1919—	Vol 1—	
<i>Parasitology (Cambridge)</i>	1908—	Vol 1—	
Proceedings of the Royal Society, Series B (London)	1905—	Vol 76—	
Public Health (London)	1908—	Vol. 22—	
<i>Reports of the Sleeping Sickness Commission of the Royal Society (London)</i>	1903—	No. 1—	
<i>Review of Applied Entomology Series A. Agricultural Series B. Medical & Veterinary (London)</i>	1913—	Vol 1—	
<i>Transactions of the Society of Tropical Medicine & Hygiene (London)</i> ..	1907—	Vol 1	
Veterinary Journal (London) ..	1909—	Vol. 65—	
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FRANCE

<i>Annales d'Hygiène et de Médecine Coloniales</i> (Paris)	1898—	Vol 1—
<i>Annales de l'Institut Pasteur</i> (Paris)	1897—	Vol 11—
<i>Archives de Médecine et de Pharmacie Militaires</i> (Paris)	1914—	Vol 63—
<i>Archives de Médecine et Pharmacie Navales</i> (Paris)	1907—	Vol 88—
† <i>Archives de Parasitologie</i> (Paris)	1898—	Vol 1—
<i>Bulletin de l'Académie de Médecine</i> (Paris)	1917—	Vol 77—
<i>Bulletin de l'Institut Pasteur</i> (Paris)	1903—	Vol 1—
<i>Bulletin de l'Office International d'Hygiène Publique</i> (Paris)	1909—	Vol 1—
<i>Bulletin de la Société de Pathologie Evolutive</i> (Paris)	1908—	Vol 1—
<i>Bulletins et Mémoires de la Société Médicale des Hôpitaux de Paris</i> (Paris)	1913—	(3 ser) Vol 29—
<i>Caducée</i> (Paris)	1913—	Vol 13—
<i>Comptes Rendus de la Société de Biologie</i> (Paris)	1903—	Vol 55—
<i>Gazette des Hôpitaux Civils et Militaires</i> (Paris)	1913—	[Vol 86 incomplete]
<i>Medical Bulletin</i> (Paris), now <i>War Medicine</i>	1917—	Vol 1—
<i>Presse Médicale</i> (Paris)	1915	Vol 23 1917— Vol. 25—
<i>Recueil de Médecine Vétérinaire</i> (Alfort) (1909 Vol 86)	1913—	Vol 90—
† <i>Répertoire de Police Sanitaire Vétérinaire</i> (Paris)	1913—	Vol 29—
<i>Revue de Médecine et d'Hygiène Tropicales</i> (Paris)	1904—	Vol 1—
<i>Revue de Pathologie Comparée</i> (Paris)	1917—	Vol 17—
<i>Revue Générale de Médecine Vétérinaire</i> (Lyons)	1913—	Vol 21—
† <i>Revue Vétérinaire</i> (Toulouse)	1913—	Vol 38—
<i>War Medicine</i> (Paris) formerly <i>Medical Bulletin</i>	1917—	Vol 1—

GERMANY.

<i>Arbeiten aus dem Reichsgesundheitsamt</i> (Berlin)	1913—	Vol 43—
<i>Archiv für Protistenkunde</i> (Jena)	1902-6	Vols 1-7
	1907-11	Vols 9-24
	1913—	Vol 30—
<i>Archiv für Schiffs- und Tropen-Hygiene</i> [<i>& Beihefte</i>] (Leipzig)	1897—	Vol 1—
<i>Archiv für Wissenschaftliche und Praktische Tierheilkunde</i> (Berlin)	1917—	Vol 43—
<i>Berliner Tierärztliche Wochenschrift</i>	1914—	Vol 30—
<i>Centralblatt für Bakteriologie</i> (Jena)		
1 Abteilung Originale	1912—	Vol 65—
<i>Deutsche Medizinische Wochenschrift</i> (Berlin)	1909—	Vol 35—
<i>Lepra</i> (Leipzig)	1913—	Vol 14—
<i>Münchener Medizinische Wochenschrift</i> (Munich)	1914—	Vol 61—
<i>Zeitschrift für Hygiene und Infektionskrankheiten</i> (Leipzig)	1912—	Vol 72—
<i>Zeitschrift für Infektionskrankheiten parasitäre Krankheiten und Hygiene der Haustiere</i> (Berlin)	1917—	Vol. 18—

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*Zeitschrift für Immunitätsforschung und
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Originale .

1908— Vol 1—

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*Annali d'Igiene [formerly Annali
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1912— Vol 22—

*Annali di Medicina Navale e Coloniale
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1918— Vol 26—

† *Atti della Società per gli Studi della
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† *Annali della Stazione Sperimentale per
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1911— Vol 1—

*Bollettino della Società Medico Chirur-
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1914— Vol 16—

[Incomplete]

Clinica Veterinaria (Milan)

1913— Vol 36—

† *Gazzetta Internazionale di Medicina,
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1913—

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1914— Vol 62—

*Giornale della R Accademia di Medicina
di Torino (Turin)*

1912— Vol 75—

*Giornale della Reale Società Italiana
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1913— Vol 35—

Malaria e Malattie dei Paesi Caldi (Rome)

1910—17 Vol 1-8 [Vols 1-3
incomplete]

*Malariologia [formerly Propaganda
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1911— Vol 4—

Moderno Zooniatro (Bologna)

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Parte scientifica

1913— Vol 2—

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Nuovo Ercolani (Milan)

1913— Vol 18—

Patologica (Genoa)

1908— Vol 1—

Pediatria (Naples)

1913— Vol 21—

(Ser 2 Vol 77—)

Policlinico (Rome) Sez medica

1912— Vol 19—

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1912— Vol 19—

*Rivista Critica di Clinica Medica
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1913— Vol 14—

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*Bulletin de l'Académie Royale de
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1915— Vol. 6—

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1915— No 1—

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- Canadian Medical Association Journal*
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- American Journal of Veterinary*
Medicine (Chicago) 1913— Vol 8—
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[Continued as *Modern Medicine*] Vol 26— No 3
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ing Syphilis (New York) 1913— Vol 31—

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<i>Journal of Economic Entomology</i> (Concord)	1908 - Vol. 1 -
<i>Journal of Experimental Medicine</i> (New York)	1896-- Vol 1 -
<i>Journal of Infectious Diseases</i> (Chicago)	1904 - Vol 1 -
<i>Journal of Laboratory & Clinical Medi-</i> cine (St. Louis)	1916 - Vol. 2 -
<i>Journal of Parasitology</i> (Urbana)	1914 - Vol 1 -
<i>Journal of Sociologic Medicine</i> (Easton)	1916 - Vol 17 -
<i>Kansas University Science Bulletin</i> (Lawrence)	1902 - Vol 1 -
Long Island Medical Journal	1919 - Vol 13
Medical Record (New York)	1914 - Vol 80 -
Military Surgeon (Washington)	1913 - Vol 33 -
<i>Modern Medicine</i>	1919 - Vol. 1 -
New Orleans Medical & Surgical Journal (New Orleans)	1912 - Vol 65 -
New York Medical Journal (New York)	1910 - Vol 91 -
<i>Proceedings of the Society for Experi-</i> <i>mental Biology and Medicine</i> (New York)	1903 - Vol. 1 -
<i>Proceedings of the United States National</i> <i>Museum</i> (Washington)	1879 - Vol. 2 - [Incomplete]
Public Health Bulletin (Washington)	1908 - [Incomplete]
Public Health Reports (Washington)	1909 - Vol 24 -
Southern Medical Journal (Nashville, Tenn)	(1911, 1912 incomplete)
<i>Southwestern Medicine</i> (El Paso, Texas)	1913 - Vol 6 -
<i>Texas State Journal of Medicine</i> (Fort Worth)	1917 - Vol 1 -
United States Naval Medical Bulletin (Washington)	1905 - Vol. 1 -
<i>United States War Department Bulletin</i> (Washington)	1909 - Vol. 3 -
University of California (Berkeley)	1913 - No 1 -
Publications in Pathology	1903 - Vol 1 -
Publications in Zoology	1908 - Vol 6 -
<i>University of Kansas</i> <i>Science Bulletin</i> (Lawrence)	1902 - Vol. 1 -

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† <i>Anales del Instituto Médico Nacional</i> (Mexico)	1904 - Vol 6 -
<i>Boletín de la Asociación Médica de</i> <i>Puerto Rico</i> (San Juan)	1914 - Vol 10 -
† <i>Cronica Medica Mexicana</i> (Mexico)	1914 - Vol. 17 -
<i>Jamaica Public Health Bulletin</i>	1917 -
Monthly Reports of the Department of Health of the Panama Canal (Washington)	1907 -
<i>Proceedings of the Medical Association</i> <i>of the Isthmian Canal Zone, formerly</i> <i>Proceedings of the Canal Zone Medical</i> <i>Association</i> (Mount Hope, C Z)	1908 - Vol 1 -
† <i>Revista Medica de Yucatan</i> (Yucatan)	1913 - Vol. 9 -
<i>Sanidad y Beneficencia, Boletín de la</i> <i>Secretaria</i> (Havana)	1910 Vol. 4 [Incomplete] 1915 Vol 14 1916 Vol 15 -

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<i>Amazonas Medico (Manaos)</i>	1918 - Vol 1—
Anales del Departamento Nacional de Higiene (Buenos Aires)	1919 - Vol 25—
<i>Anales de la Facultad de Medicina (Lima)</i>	1918— Vol 1—
Anales del Instituto Modelo de Clinica Medica (Buenos Aires)	1917-- Vol 2—
Annaes Paulistas de Medicina e Cirurgia (San Paulo)	1915 - Vol 4 No 3—
<i>Archivos Brasileiros de Medicina (Rio de Janeiro)</i>	1911 - Vol 1 -
<i>Archivos da Escola Superior de Agricultura e Medicina Veterinaria (Pinheiro, F. do Rio)</i>	1917 Vol 1 -
† <i>Boletim da Sociedade Brasileira de Dermatologia (Rio de Janeiro)</i>	1912— Vol 1 -
Brazil Medico (Rio de Janeiro)	1909— Vol 23—
British Guiana Medical Annual	1890-92, 1894-1902, 1906—
Cronica Medica (Lima)	1913— Vol 30—
Gaceta Medica de Caracas (Caracas)	1911— Vol 21—
<i>Memorias do Instituto Oswaldo Cruz (Rio de Janeiro Mangumhos)</i>	1909— Vol 1—
Repertorio de Medicina y Cirugia (Bogota)	1914— Vol 6—
<i>Revista Olimpica (Medellin, Colombia)</i>	1916— Vol. 1—
Revista del Instituto Bacteriologico (Buenos Aires)	1918— Vol 1 No 2—
† <i>Revista Medica de S Paulo (S Paulo)</i>	1912— Vol 15—
Revista de Veterinaria e Zootecnia (Rio de Janeiro)	1917— Vol 7—
Saude (Rio de Janeiro)	1919— Vol 2—
<i>Servico Sanitario do Estado de Sao Paulo</i>	1918— N S. No. 1—

ASIA

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Agricultural Research Institute, Pusa, Bulletins (Calcutta)	1912— [Incomplete]
Boletim Geral de Medicina e Farmacia (Nova Goa)	1919— 5 Ser. No 1 -
Indian & Eastern Engineer (Calcutta)	1915— Vol. 36—
Indian Engineering (Calcutta)	1915— Vol 57— No. 6—
<i>Indian Journal of Medical Research (Calcutta)</i>	1913— Vol 1—
Indian Medical Gazette (Calcutta)	1889-1908 [Vols 24 & 34-43 Incomplete]
<i>Madras Veterinary Journal (Madras)</i>	1909— Vol 44—
Medical Missions in India (Pokhuria)	1919— Vol 1
<i>Memoirs of the Department of Agriculture in India (Calcutta)</i>	1912— Vol 18—
<i>Bacteriological Series</i>	1912— Vol 1—
<i>Veterinary Series</i>	1913— Vol 1—
Report of the Agricultural Research Institute and College, Pusa (Calcutta)	1907— [Incomplete]

JAPAN.

<i>Acta Scholae Medicinalis Universitatis Imperialis in Kioto (Kioto)</i>	1916— Vol. 1—
Chosen Sotoku Fu Igakki	1919—
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Jikwa Zasshi ..	1917 -	
<i>Kitasato Archives of Experimental Medicine (Tokyo)</i> ..	1917 -	Vol 1—
Kyoto Iku Zasshi (Kyoto)	1917 -	Vol 11 -
Mitteilungen aus der medizinischen Fakultät der Kaiserlichen Universität zu Tokyo (Tokio)	1911 -	Vol 10 -
Mitteilungen aus dem pathologischen Institut der Kaiserlichen Universität zu Sendai, Japan ..	1919	Vol 1
Mitteilungen der Medizinischen Gesellschaft zu Tokio (Tokio)	1917—	Vol 31—
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Sei Kwai Medical Journal (Tokio)	1913 -	Vol. 32—
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Tokyoer Medizinische Wochenschrift (Tokyo)	1917—	No. 2046—
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China Medical Journal (Shanghai)	1912—	Vol. 26—
National Medical Journal of China (Shanghai) ..	1919—	Vol. 5—

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Geneeskundig Tijdschrift voor Nederlandsch Indië (Rijswijk Batavia) ..	1901—	Vol. 41— [Incomplete]
<i>Mededeelingen van den Burgerlijken Geneeskundigen Dienst in Nederlandsch-Indië (Batavia)</i>	1912—	Vol. 1—
Mededeelingen uit het Geneeskundig Laboratorium te Weltevreden (Batavia) ..	1919—	3 Ser A No. 1—
Nederlandsch-Indische Bladen voor Diergeneeskunde en Dierentelct (Batavia)	1919—	Vol 31—
<i>Philippine Journal of Science, formerly Philippine Journal of Science Section B. Philippine Journal of Tropical Medicine (Manila)</i>	1906—	Vol 1—
Veeartsenijkundige Bladen voor Nederlandsch Indië (Batavia) ..	1917—	Vol 29—

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Annual Reports of the Institute for Medical Research, Kuala Lumpur, Federated Malay States (Kuala Lumpur)	1912—	
Bulletin de la Société Médico Chirurgicale de l'Indochine (Hanoi & Haiphong) ..	1910—	Vol. 1— [Vol. 2 Incomplete]
<i>Medical Journal of the Siamese Red Cross</i>	1918—	Vol. 1—
Studies from Institute for Medical Research, Federated Malay States (Singapore) ..	1901—	Vol 1—[Incomplete]

AFRICA

<i>Archives de l'Institut Pasteur de Tunis</i> (Tunis)	1906 - Vol 1
Medical Journal of South Africa [formerly Transvaal Medical Journal] (Johannesburg)	1912 Vol 8
<i>Nyasaland Sleeping Sickness Diary</i> (Zomba)	1908 15 No 1 25
† <i>Revue Médicale d'Alger</i> (Algiers)	1911 - Vol 2-
Rhodesia Agricultural Journal (Salisbury)	1915 - Vol 12-
South African Institute for Medical Research (Publications)	1913- Vol 1 -
South African Medical Record (Cape Town)	1910- Vol 8-

MAURITIUS

† <i>Bulletin de la Société Médicale de l'Île Maurice</i> (Mauritius).	1909- Vol 27-
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AUSTRALASIA.

AUSTRALIA

<i>Australian Institute of Tropical Medicine. Collected Papers</i> (Townsville)	1914- No 1-
<i>Commonwealth of Australia Quarantine Service Publications</i> (Melbourne)	1913- No 1-
<i>Medical Journal of Australia</i> (Sydney)	1914 - Vol 1 -
<i>Queensland Agricultural Journal</i>	1919 - Vol 12-

NEW ZEALAND

New Zealand Medical Journal (Wellington)	1913- Vol 12. No 45-
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NOTE—The Director would consider proposals for the exchange of the Bureau publications with other medical and scientific journals in which original papers on tropical diseases or parasitology are published

The Library possesses complete sets of the following TROPICAL JOURNALS WHICH HAVE CEASED PUBLICATION —

<i>American Journal of Tropical Diseases and Preventive Medicine</i> (New Orleans)	1913-16	Vols 1-3
<i>American Society of Tropical Medicine (Transactions)</i> (New Orleans)	1914-14	Vols. 1-0
<i>Journal of the London School of Tropical Medicine</i> (London)	1911-13	Vols 1-2
<i>Journal of Tropical Veterinary Science</i> (Calcutta)	1906-12	Vols 1-7
<i>Kala Azar Bulletin</i> (London)	1911-12	Nos 1-3
<i>Paludism</i> (Simla)	1910-12	Nos 1-5
<i>Scientific Memoirs by Officers of the Medical & Sanitary Departments of the Government of India</i> (Calcutta)	1902-13 (New ser.)	Nos. 1-50
<i>Sleeping Sickness Bulletin</i> (London)	1908-12	Vols 1-4
<i>Yellow Fever Bureau Bulletin</i> (Liverpool)	1911-15	Vols. 1-3

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